THE IRON TRADE REVIEW

VOLUME XXXIV. CLEVELAND, O., AUGUST 22, 1901. NUMBER 34

THE WEEK IN IRON CIRCLES.

THE MARKET AT LARGE.

The steel strike has taken on some phases of a long-drawn fight in the past week, but without any developments indicating a different outcome from that heretofore predicted. The National Tube Co. has been hurt most by the latest additions to the strikers' ranks, and next in importance are the strikes at Bay View and Joliet, which will most directly affect the markets for billets, light rails, bars, splices and track supplies. Six Bessemer steel plants with daily output of fully 7,500 tons of ingots are now idle. As against these gains of the strikers the steel corporation has increased its working forces in the hoop mills in the Pittsburg district, in the sheet mill at Wellsville and the tin plate plant at Cleveland, and is getting further tin plate plants in readiness to start. The effect of the action at Bay View and Joliet, and the spreading of the strike to National Tube Co. works in which the Amalgamated Association has no foothold, the organizations being tributary to the American Federation of Labor, will probably delay breaks from the strikers' ranks in the Pittsburg district until the coming in of fall. Thus far the attempts to shut down the Duquesne works of the Carnegie Steel Co., upon which the strikers' secret work has been concentrated, have failed, as has also the effort to close the Upper and Lower Union mills in Pittsburg. Not a rail mill has been touched, as yet, and the heavy tonnage steadily going out through these channels is at maximum. There has been considerable inquiry for rails for delivery in 1902, the Chicago interest reporting 50,000 tons of such inquiry. Bars continue to be the most active factor in the market, agricultural buying for the coming year being reinforced by a miscellaneous demand that tells of heavy and well distributed consumption. One Central Western contract for several thousand tons was placed at 1.40c Pittsburg for steel and 1.45c Valley mill for iron. On early deliveries 1.50c at mill is paid for both steel and iron as a minimum. The demand upon concerns carrying stocks of sheets has made large inroads, and the pinch is being felt most by makers of stoves into which sheets enter largely, with the result that in turn the foundries making castings for such stoves are running light. This condition will be accented in the next few weeks. though the 50 per cent of the leading sheet company's mills that are in operation are making record outputs. The short supply of pipe and of boiler tubes has led to advances in jobbers' stocks, with the probability that yet higher prices will be paid. Tin plates have advanced to $7 a box for ordinary coke stock, and an inquiry for 50,000 boxes went begging in the Pittsburg market. Thus far importations have been comparatively small but a better supply is expected after Sept. 1. Among export business started by the strike are mentioned orders from Canada for steel hoops, placed in the Glasgow district. The importation to the United States of black plates for tinning and of black sheets for galvanizing will be increased it is expected if the strike should be prolonged. For the first time since the struggle began the wire trade is affected, the Joliet plant of the American Steel & Wire Co. being forced to close because its supply of rods was cut off. This will increase the difficulty, which was beginning to be noticed in the West, of keeping pace with demand for wire products. Firmer prices for billets have resulted from the closing of Central Western steel plants, and $24.50 Pittsburg is now minimum for 4x4 billets, while an agreement on small billets keeps the minimum at $26. The market for Bessemer iron is flat, with $15 as the nominal quotation at Valley furnace. It is believed that little if any iron will be taken by the steel corporation from merchant furnaces in September. Foundry iron is fairly active in some centers and quiet in others, with prices a trifle weaker on Northern irons. Forge iron is weaker also, on the curtailment of puddling operations for the skelp trade. Leading products that are unaffected by the strike are plates and structural material in both of which demand is strong, with mills unable to gain on order books. In view of the general exhaustion of stocks of finished material due to the strike, there is little question that as replenishment orders flow in again the market will be kept strong for months to come.

PITTSBURG.

OFFICE OF *The Iron Trade Review*,
429 PARK BUILDING, Aug. 21.

The steel strike was further extended yesterday to the Continental and Pennsylvania tube plants of the National Tube Co. Neither of these plants have ever been organized before and the refusal of the men to continue work in them was a surprise. The spreading of the strike during the past week to the mills of the Federal Steel Co. has greatly swelled the list of striking employes, and owing to the rampant strike fever there is little to indicate the ultimate extent of the trouble.

At the present writing there are no negotiations for peace on and it is understood that no steps will be taken by the United States Steel Corporation to bring about a settlement. The necessity of defeating the Amalgamated Association is becoming more apparent daily. In view of the week's developments the most optimistic do not predict that the backbone of the struggle will be broken before October. It will be largely a waiting game on the part of the manufacturers and with the return of the cold weather many of the strikers will have had sufficient idleness to make them want work. In the past week the gains at certain mills of the American Steel Hoop Co. and American Tin Plate Co. have been considerable.

The extension of the strike has greatly affected the pig iron market, and the only buyers at present are the foundries who are satisfied to cover for immediate delivery only. Owing to the shutting down of so many puddling furnaces there is little demand for forge iron while the demand for Bessemer for September will amount to little or nothing. Four furnaces of the National Steel Co. have already been banked on account of the strike and others will probably be banked shortly. The shuttting down of the Bay View and Joliet mills of the Illinois Steel Co. further curtails the production of steel bars, light angles, light rails, hoops, bands and cotton ties. The rail production has as yet, however, been unaffected. Owing to the shutting down of the tube plants of the National Tube Co. the production of merchant pipe, tubing and casing

has been greatly curtailed and jobbers are already asking advances on their stocks.

Bessemer billets are also scarce and prices have advanced to $24.50 and $25 per ton. Tin plate, which has been more affected by the strike than any other product, is selling at $7 per box for coke plates. An inquiry for 50,000 boxes of tin plate was received here this week and $7 per box was offered, but none of the local jobbers could accept the order as they were in no position to have it filled.

To the great satisfaction of the trade the American Sheet Steel Co. is making shipments in a surprising way when it is considered that more than half of its mills are shut down. As yet no new business is being accepted, but it is believed the contract books will be opened shortly for future deliveries.

PIG IRON.—Shipments of Bessemer iron from the merchant furnaces in the valleys are being made regularly, but a large tonnage has been diverted from the plants of the National Steel Co. to the Carnegie plants. Owing to the shutting down of so many steel plants, however, the amount of Bessemer that is being received by the United States Steel Corporation is greater than the plants in operation can consume, and the buying for September dlivery will amount to little or nothing. Three furnaces of the National Steel Co. at New Castle are banked awaiting a resumption of operations and at Mingo Junction, O., another furnace has been banked during the week. The furnaces of the National Tube Co. at McKeesport, Pa., and Wheeling, W. Va., were banked this week. Bessemer iron for delivery in September is quoted at $15 in the Valley and it is probable that this figure could be shaded for any considerable tonnage. Foundry iron is selling in carload lots almost entirely and is quoted at $13.75 to $14, Pittsburg, for No. 2. Forge iron is offered at $13.75. This figure could also be bettered for a large order. We revise our quotations as follows:

Bessemer, Valley	$15 00 to 15 25
Bessemer, Pittsburg	15 75 to 16 00
No. 1 Foundry	14 50 to 14 75
No. 2 Foundry	13 75 to 14 00
No. 3 Foundry	13 25 to 13 50
Gray Forge, Pittsburg	13 60 to 13 75
Chilled Basic, Valley	14 40 to 14 50
Chilled Basic, Pittsburgh	15 15 to 15 25

STEEL.—Bessemer billets are firm and scarce. The tonnage offered for prompt shipment is very small and $25 per ton is asked for prompt deliveries. Basic billets are quoted at $25 to $26 per ton. Wire rods are held at $35 to $36 per ton.

FERRO-MANGANESE.—Small lots of domestic manganese are now being offered on the market at $55 per ton, delivered at buyers' mill, while foreign, 80 per cent is held at $53.50 per ton.

SPELTER.—The market continues quiet and prime Western grades continue to be held at 3.93c to 3.95c, Pittsburg.

MUCK BAR.—Muck iron continues scarce and small lots have been purchased during the week at $31 to $31.50 per ton.

SKELP.—Both iron and steel skelp continue scarce and prices are moving upward. Sheared iron skelp is held at 2.10c to 2.15c, while grooved is held at 2.05c to 2.10c. Steel skelp, both grooved and sheared is held at 1.90c to 2c.

RAILS AND TRACK MATERIAL.—Thus far the steel strike has not affected the production of steel rails. The production of light rails, by the shutting down of the Bay View plant of the Illinois Steel Co. has been greatly curtailed and as the output of these rails is limited prices will no doubt advance. We make the following quotations: Standard sections, 50 pounds and over, in lots of 200 tons and over, $28; car lots and less than 200 tons, $30; less than car lots, $32; light rails, 8 pounds, $45; 12 pounds, $38; 16 pounds, $35; 20 pounds, 34; 25 to 40 pounds $32. Track material: Spikes, 1.95c to 2c; track bolts, square heads, 2.40c; hexagon heads, 2.55c; fish plates, 1.50c to 1.60c.

PLATES.—The demand for plates continues fair and the mills are comfortably filled with business for deliveries during the next two months. Thus far the strike has not affected the plate mills of the United States Steel Corporation. We make the following quotations: Tank plate, ¼-inch thick up to 100 inches in width, 1.60c at mill, Pittsburg; flange and boiler steel, 1.70c; marine, ordinary firebox, A. M. B. A. specifications, 1.80c; still bottom steel, 1.80c; locomotive firebox, not less than 2.10c; and it ranges in price to 3c. Plates more than 100 inches wide, 5 cents extra 100 pounds. Plates 3-16 of an inch in thickness, $2 extra; gauges Nos. 7 and 8, $3 extra; No. 9, $5 extra. These quotations are based on carload lots, with 5 cents extra a hundred pounds for less than carload lots. Terms, net cash in 30 days.

BARS.—A good demand continues for steel bars and with the closing of the merchant mills of the Illinois Steel Co. considerable business will be thrown to the bar plants now in operation. Steel bars are held at a minimum of 1.50c for carload lots of open-hearth, while from 1.55c to 1.60c is asked for bars in less than carload lots. Indications are favorable to another advance in the price, as nearly all the mills are comfortably filled with business until the first of the year. Common iron bars are quoted 1.50c to 1.55c and refined bars at 1.65c and upward.

PIPES AND TUBES.—The plants of the National Tube Co. both at McKeesport and Wheeling are badly crippled on account of the strike. This week the Pennsylvania and Continental departments located here were closed because the men were offered skelp which they allege was rolled by the Carnegie Steel Co. Jobbers with large stocks of pipe on hand have already made slight advances and others will follow in case the strike continues for any length of time. The National Tube Co. is holding its prices unchanged, but cannot make promises on deliveries owing to the present status of affairs. Discounts to consumers in carload lots, Pittsburg, are as follows:

MERCHANT PIPE.

	In carloads. Blk.	In carloads. Galvd.	Less than carloads. Blk.	Less than carloads. Galvd.
⅛ to ⅜ inch and 11 to 12 inches	59.2	46.2	54.9	40.5
½ to 10 inches	66.7	53.3	61.9	49.9

BOILER TUBES.

	22 Feet and under. Per cent. Iron.	Steel.
1 to 1¾ and 2¾ to 5 inches, inclusive	43¾	65¾
2 to 2½ inches, inclusive	43	60
6 inches and larger	53	39

CASING.

	S. and S. Per cent.
2 to 3 inches	58
3¼ to 4 inches	63
4¼ to 12¼ inches	65

O. D. PIPE.

	Per cent.
14 to 22 inches	42
24 inches, o d. and larger	37

THREADS AND COUPLINGS.

	Per cent
14 to 16 inches o. d.	35

SHEETS.—The American Sheet Steel Co. is making very satisfactory shipments to the trade. The mills in operation are producing a greater tonnage than ever before and it is believed that the sheet combine will shortly commence to book new business. Black sheets are now quoted at 4c to 4.25c, for prompt shipment, No. 28 gauge. The independent mills are holding black sheets, No. 28 gauge, at 3.25c to 3.35c, for future delivery. Galvanized sheets for prompt delivery are sold at 65 off while for future delivery the discounts are 70 and 5 off.

STRUCTURAL MATERIAL.—A large amount of new business is being offered in structural material but deliveries cannot be promised before late September. Already inquiries are being made for material for delivery next year as a large amount of building is in contemplation, equal to or even greater than that under way this summer. Prices remain unchanged as follows: Beams and channels, 3 to 15 inches, 1.60c; 18 to 24 inches, 1.70c; tees, 1.65c; zees, 1.60c; angles, fom 3 to 6 inches, 1.60c; universal mill plates, 1.60c.

WIRE AND WIRE NAILS.—A good demand for wire and cut nails has already set in and there is every indication that the fall trade will be very large. The demand for wire products is also fair and will no doubt greatly increase within the next few weeks. Prices are unchanged as follows: Single carloads of wire nails to jobbers, $2.30, Pittsburg, to retailers, $2.40; plain wire, carload lots, is quoted at $2.25 to jobbers and $2.35 to retailers; painted barb wire, $2.60, in carload lots to jobbers, and $2.70 to retailers; galvanized barb wire, $2 in carload lots to jobbers, and $3 to retailers. Cut nails are quoted at $2, Pittsburg, in carload lots, 2 per cent off in 10 days.

MERCHANT STEEL.—A brisk demand for tool steel is reported and contracts are being closed for delivery the remainder of the year. The shafting situation is satisfactory, a large amount of business having been placed during the past few

weeks. We make the following quotations: Turned, cold rolled and ground shafting at 55 per cent off for car lots and 50 per cent off for less than car lots, tire steel in carload lots and over, 1.60c; less than carload lots, 1.75c to 1.80c. Toe calk is held at 1.70c in large lots, and in small lots as high as 1.85c. Tool steel is held at 7c and upwards, according to quality.

OLD MATERIAL.—Despite the strike the demand for old material is good. We note the sale of 1,000 tons of car wheels at $16 per gross tons. Also the sale of 1,000 tons of heavy steel scrap at $15.50 per gross ton. We make the following quotations: Heavy melting stock, $15 to $15.50; low phosphorus melting stock, $16.50 to $17.50; steel rails, $15.50 to $16; busheling scrap, $13 to $14; No. 1 wrought, $16 to $17; iron rails, $18 to $19; cast borings, $6.50 to $7; cast scrap, $13.50 to $14.

COKE.—A large number of ovens in the Connellsville coke region will hereafter be operated only five days a week, owing to the shutting down of a number of furnaces by the National Steel Co. and the National Tube Co. During the week ending Saturday, Aug. 10, the estimated production reached 238,291 tons, a gain of nearly 400 tons over the previous week. Outside producers of coke are finding it somewhat difficult to dispose of their product and furnace coke is being freely offered at $1.30 to $1.50 per ton. Foundry coke is quoted at $1.60 to $1.85. Connellsville furnace coke is held at $1.75 to $2 while foundry is held at $2 to $2.25.

CHICAGO.

OFFICE OF *The Iron Trade Review*,
534 MONADNOCK BLOCK, Aug. 20.

There has been a decided stiffening in prices of all finished materials in this market this week, due to the recent change of feeling among the employes of the Federal Steel Co. in its Western mills. This has already resulted in strikes at the Bay View plant, Milwaukee, and at Joliet. A few employes in the South Chicago mills have stayed away from work on one pretext or other, crippling a few departments, but with these exceptions the men are firm in their decision to keep their contracts. They have issued an address giving reasons for their attitude. The closing of the Joliet steel works necessitated the closing of the plant of the American Steel & Wire Co. in the same city, as its supply of wire rods was shut off.

The demand for bars is the chief feature of the market this week. Each day it grows heavier, and the closing of the merchant mills at Joliet and Milwaukee, serves to accentuate the situation. That it will result in a further increase in prices is not doubted, and there are predictions of 2c bars before the strike is ended. The purchases of sheets continue a close second to those of bars, and already the warehouses report that their stock in some sizes is exhausted. The basis on No. 27 black from store has been increased to 4c to 4.25c, and that of galvanized from store 65 per cent to 60 per cent. Smooth finished tire steel has gone up ten cents a hundred. The demand for nails and other wire products has exceeded all previous figures for this period of the year, the local interest stating that it has a greater number of orders on its books than can possibly be filled within the time required by customers. The closing of the Joliet plant adds still further to the difficulty of shipment. An exceedingly heavy inquiry for boiler tubes and other boiler materials has come to the surface with the closing down of the plant of the National Tube Co. and the further extension of the strike.

The pig iron market improves, though buyers, in the main, prefer ordering by carload lots to contracting for their season's supply. One local concern reports having booked two orders of 1,000 tons each for Southern iron, and a few orders of good size were booked by other commission merchants. With the end of the molders' strike, there will be a resumption of heavy buying.

PIG IRON.—Though there is a dearth of large contracts, there is a good business doing in carload lots. The effects of the steel strike have extended to the pig iron market. The shortage of sheets is already felt by a number of stove foundries, and if this condition is protracted it will undoubtedly result in the partial closing of a number of foundries engaged in the manufacture of castings for stove purposes. Aside from this, there are evidences of active buying for other lines of foundry operations. Comparatively few concerns have contracted for their season's supply of iron, and it is expected many will take advantage of the prevailing low prices, as soon as there are some indications of the various strikes coming to an end. There is a fairly good demand for Southern iron, one local concern having booked two orders, of 1,000 tons each. Other commission merchants also report a number of good sized orders, with an accompanying good inquiry. Our quotations follow:

Lake Sup Charcoal...	$17 50 to $18 00	Southern Coke No. 4	$13 90 to $14 15
Local Coke Fdy. No. 1	15 50 to 16 00	Southern No. 1 Soft...	15 40 to 15 55
Local Coke Fdy. No. 2	15 00 to 15 50	Southern No. 2 Soft...	14 90 to 15 15
Local Coke Fdy. No 3	14 50 to 15 00	Southern Silveries.....	15 45 to 15 50
LocalScotchFdy.No 1	15 50 to 16 00	Jackson Co. Silveries	17 00 to 17 50
LocalScotchFdy No. 2	15 00 to 15 50	OhioStrong Softeners	16 50 to 17 00
LocalScotchFdy No 3	14 50 to 15 00	Alabama Car Wheel...	21 00 to 22 00
Southern Coke No. 1	14 65 to 15 15	Malleable Bessemer..	16 00 to 17 00
Southern Coke No. 2	14 15 to 14 65	Coke Bessemer.....	17 50 to 18 50
Southern Coke No. 3	14 15 to 14 65		

BAR IRON.—The independent mills in this locality report heavy bookings and an increasing demand for prompt shipment of material. The closing of the mills of the Federal Steel Co. at Joliet and Bay View, Milwaukee, has resulted in further stiffening of prices, and there is now talk that the price of iron will go to two cents. There is really no market price at present, the price varying according to the size of order and shipment desired. We quote steel bars, 1.70c, Chicago, and iron, 1.65c, Chicago. Out of store, steel, 1.90c; iron, 2c.

SHEETS.—Conditions do not materially differ from those of the past week. Practically all the buying is confined to warehouses, one jobbing house stating that their stock was practically depleted and another that they were sold out on various sizes. It will not be many weeks, at the present rate of buying, before the entire stock in Chicago will have been sold. We revise our prices, as follows: No. 27 black, 4c to 4.25c, and galvanized 60 per cent to 65 per cent from store.

STRUCTURAL STEEL.—A contract for 1,500 tons of structural steel was closed with an out-of-town concern by a local company. This is the only noteworthy order this week. Business in small lots continues up to the past average. The Sanitary District of Chicago decided last week to build another bridge of the bascule type at a cost of $170,000. Contracts have not yet been let. We quote mill shipments carload lots, as follows: Beams, 15 inches and under, 1.75c; 18 inches and over, 1.85c; angles, 1.75c to 1.80c; plates, 1.75c; tees, 1.80c; zees, 1.75c; small lots from store, ¼c higher; beams and channels from store, ½c per pound higher.

RAILS AND TRACK SUPPLIES.—None of the local concerns is booking orders for the delivery of rails next year, though inquiries for about 50,000 tons of standard sections were made last week. Both the Illinois Steel Co. and the Republic Iron & Steel Co. are sold up for the next 90 days on track supplies and light rails. There is a good inquiry for all these materials, and the closing of the Joliet and Bay View plants of the Federal Steel Co., at both of which bar iron was made for working into spikes and track supplies, will further delay this company in the fulfillment of its contracts. Our quotations, follow: Standard rails, $28; light sections, $33 to $35; according to size; out of store, $40 to $44; splice bars, 1.60c to 1.70c; spikes, 1.90c to 2c; out of store, 2c; track bolts, hexagon nuts, 2.80c to 2.90c; out of store, 2.50c to 3c; square nuts, 2.65c to 2.75c; out of store, 2.75c to 2.85c.

PLATES.—There is no change in the situation. A good business continues to be booked for all branches of the trade. Mills report they are still behind in deliveries. Our quotations follow: Tank steel, base, ¼ inch, 1.75c; flange steel, 1.90c to 2c; marine steel, 1.95c; firebox steel, ordinary, 2c to 2.10c; special, 2.25c and upwards. Tank steel from store, 1.90c to 2c; flange steel from store, 2c to 2.10c.

MERCHANT STEEL.—Manufacturers report a good trade during the past week with continued contracts for future delivery. Smooth finished steel tire has been advanced ten cents per 100 lbs., and if present conditions continue, further advances in other items are not improbable. Our quotations follow: For mill shipments, Chicago delivery, smooth finished tire steel, 1.90c to 2c; open-hearth spring steel, 2.50c to 2.75c; toe calk, 2.40c to 2.60c; sleigh shoe, 1.85c to 1.90c; cutter shoe, 2.40c to 2.60c; ordinary tool steel, 6c to 7c; specials, 13c and upwards. Cold rolled shafting, carload lots, 55 per cent and upwards.

MERCHANT PIPE.—The closing down of the National Tube Co.'s plants and the further extension of the strike, has re-

sulted in a very heavy inquiry for boiler tubes. In merchant pipe there is a continued good demand. We quote manufacturers' prices, random lengths, as follows:

MERCHANT PIPE.

	Carload lots.		Less than carload lots.	
	Black Per cent.	Galv. Per cent.	Black Per cent.	Galv. Per cent.
⅛ to ⅜ and 11 to 12 in	59.2	46.2	54.9	40 9
¼ to 10 inches	66.7	53.3	61.9	49 9

WIRE AND WIRE NAILS.—The local manufacturer reports that there has been a heavy increase in the demand for nails and other wire products in the past week. The closing of the Joliet mill of the Federal Steel Co. will shut off the supply of wire rods to the American Steel & Wire Co.'s plant in the same city. However, the company still has a large stock of nails on hand from which it will be able to fill orders for some time to come. Prices remain unchanged as follows: Carloads of wire nails to jobbers, $2.40, Chicago; to retailers, $2.50; plain wire, carload lots to jobbers, $2.35, to retailers, $2.45; painted barb wire to jobbers, carloads, $2.70, to retailers, $2.80; galvanized barb wire, carloads to jobbers, $3, to retailers, $3.10.

OLD MATERIAL.—With the exception of busheling, there is little demand for scrap iron. We report dealers' prices per gross ton, as follows:

Old iron rails	$19 00 to $19 50	Old Wheels	$16 00 to $16 50
Old steel rails, long	15 00 to 16 00	Heavy melting steel	13 00 to 13 50
Old steel rails, mixed	13 50 to 14 00	Mixed country steel	10 00 to 10 50
Relaying rails	20 00 to 22 00		

The following are selling prices per net ton:

No. 1 R. R. wrought	$14 00 to $14 50	Iron axles	$19 00 to $19 5
No. 2 R. R. wrought	12 50 to 13 00	Cast borings	4 00 to 4 5
Dealers' forge	12 00 to 12 50	Wrought turnings	9 00 to 9 5
No. 1 busheling	10 00 to 10 50	Iron axle turnings	10 50 to 11
Heavy cast	11 00 to 11 50	Steel axle turnings	9 50 to 10 00
Railway malleable	12 00 to 12 50	Stove plates	7 50 to 8 00
Country malleable	10 50 to 11 00	Old iron splice bars	16 00 to 16 05

CLEVELAND

OFFICE OF *The Iron Trade Review*,
1064 ROSE BUILDING, Aug. 21.

The ore trade is without incident except that there continues a small lot trade at prices established early in the season. Some options on considerable lots of Mesabi ore expire with Sept. 1. Whether the buyers will have light enough on the steel strike to enable them to close on that date is a question. The banking of furnaces at New Castle, Pa., and more recently in the Wheeling district holds up enough direct shipments of ore to aggravate to a considerable degree the bad dock conditions at Lake Erie ports. The delays due to car shortage and to the limited dock space for ore storage have been more marked in the past two weeks and it is now certain that the ore movement in August will fall quite a little below that of July.

PIG IRON.—The closing down of five Bessemer steel plants—one at New Castle, one in the Pittsburg district, and three in the Wheeling district—puts a different aspect on the Bessemer pig iron market. There are no sales and the indications are that little if any iron will be taken by the United States Steel Corporation steel plants in September. There is no great accumulation as yet. The Carnegie Steel Co. converters and open-hearth furnaces are making unusual outputs and shipments from merchant furnaces have been diverted but not cut off. We quote Bessemer at $15 in the Valley, with the feeling weaker than for months. Foundry iron is being taken in 100 to 200 ton lots but no large buying is reported in this territory. While sellers disclaim sales at less than $13.25 at Valley furnaces for No. 2, it is admitted that that quotation has failed to take business in many instances, and $13 is reported as the basis of several recent transactions. Forge iron is rather weaker, and we quote at $12.85 to $13 in the Valley. Southern irons are rather firmer or at least there is more uniformity in quotations. There is on neither side of the market a disposition to do business for many months ahead, but rather a desire to await the outcome of the disturbing elements. We quote the Cleveland market as follows:

Bessemer	$16 00	Valley Scotch No. 1	$14 50 to $14 75
No. 1 Strong F'dry	14 50 to 14 75	Valley Scotch No. 2	14 00 to 14 25
No. 2 Strong F'dry	14 00 to 14 25	Gray forge, Valley	13 00
No. 3 Foundry	13 75 to 14 00	LakeSuperior charc'l	17 00 to 17 50

FINISHED MATERIAL.—Jobbers report that their stocks of sheets are not far from the end, with no prospect that they can be replenished in the near future. The prices asked depend entirely upon the conditions—the previous relations of buyer and seller, the urgency of the latter, etc. For No. 28 sheets, one pass through cold rolls, 4c is readily obtained, and some higher prices have been made. Buyers depending on the American Sheet Steel Co. are getting shipments on their orders, but only for part of their usual quota. In heavy sheets there is continued scarcity as the efforts of the large sheet company are concentrated on lighter gauges. For No. 12 tank stock, 2.15c at mill is paid and for No. 12 blue annealed, 2.60c. In their inability to get blue annealed sheets some buyers are compelled to fall back on the common red stock. There has been good activity in bars and for early delivery 1.50c at mill is obtained for both steel and iron. An Ohio agricultural implement concern was in the market for several thousand tons the past week, the order being divided among Pittsburg and Valley concerns. The contracts are reported to have been based on 1.40c, Pittsburg, for steel and 1.45c Valley for iron. The two independent Cleveland mills are reported to be filled up for practically the balance of the year. The structural market is firm, with mills sold on ordinary sizes for three months ahead. Construction firms carrying stocks of beams and channels are having a good business and are getting 3c a pound for their stock, and more for cutting to lengths. Their stocks will have to be replenished in turn, but there is no disposition to place new contracts now, as no advance over the 1.70c Cleveland basis is looked for this year. Plate mills are getting out a large tonnage, but are not catching up. A good many contracts placed before the advance to 1.60c Pittsburg last spring will soon run out and further buying is looked for, particularly for boiler and tank work. The scarcity of merchant pipe is marked, the independent mills having been far behind orders, as was the case in sheets, before the strike began.

OLD MATERIAL.—Apart from continued buying for the Republic Iron & Steel Co. the market is quiet. The following are dealers' quotations, gross tons, f. o. b., Cleveland: Old iron rails, $19 to $20; old steel rails, $15; old car wheels, $16; No. 1 railroad wrought scrap, $16; mill scrap, $13.50 to $14.50; No. 1 machine cast scrap, $13 to $13.50; iron axles, $22; wrought turnings, $12; cast borings, $6.50 to $7; grate bars, $8.50 to $9; stove plate, $9.50.

CINCINNATI.

Aug. 20.

Rogers, Brown & Co. say of the current pig iron market: "The business of the week has aggregated a large tonnage made up of numerous fair-sized lots and an unusual run of smaller orders and carloads. Prices on Southern irons have stiffened. The two largest producers having booked a heavy tonnage the past month, have decided to hold to their schedule of prices, and at this writing are doing so, imparting a stronger tone to the market in general. Northern foundry and mill grades have continued in active request, especially choice foundry irons and prices have been well maintained. Consumption continues large, absorbing the furnace products with ease. Production in July was 1,316,437 tons, which was a slight decline as compared with June. The furnace stocks decreased during July approximately 6,700 tons, and were 387,329 tons Aug. 1, the smallest since June, 1900."

Matthew Addy & Co. are optimistic in their views: "Business keeps up in a most remarkable and satisfactory way. Neither the strike nor the drought has had the slightest effect on it and today consumption is evidently at the very highest point ever reached in America. The July statistics showed production that month declined as did furnace stocks. Consumption and production are now pretty nearly balanced although the former is undeniably the greater. The stocks on hand in furnace yards represent about all the merchant iron in the country. Consumers have no iron in their yards; in fact most of them have so small a supply ahead that a delay of a week in making shipment has often caused a temporary shut down. It has been the policy of most buyers for several months now to buy iron only as it was needed for immediate consumption. This explains the regular and constant buying which has been such an unusual feature of summer.

"The week just past was more active than any week recently. There were several round lot orders placed for grey forge, foundry, car wheel and malleable irons. Then the smaller

orders footed up to a goodly tonnage. While these minor orders are not much in themselves yet they form the backbone of trade. Prospects for the near future are good. The little buying is bound to keep up just as it has been doing for so long. Then there are several large inquiries now on the market. These will in the next few days be turned into actual business."

We quote for cash f. o. b. cars Cincinnati: Southern coke, No. 1 foundry, $13.50 to $13.75; No. 2 foundry, $13 to $13.25; No. 3, $12.50 to $12.75; No. 4, $12.25 to $12.50; gray forge, $12 to $12.25; No. 1 soft, $13.50 to $13.75; No. 2 soft, $13 to $13.25; Lake Superior coke, No. 1, $15 to $15.25; No. 2, $14.50 to $14.75; Hanging Rock charcoal, No. 1, $20 to $20.50; Jackson Co. silvery, No. 1, $15.50 to $16; Standard Southern car wheel, $17 to $18; Lake Superior charcoal, $18.50 to $19.

PHILADELPHIA.

Aug. 20.

There is but little change in the situation from that of a week ago. An excellent demand is noted for nearly all materials in iron and steel and were it not for the general hesitation caused by the big strike in Western mills, we should undoubtedly witness a period of great activity. As it is we are doing well indeed and business shows much less fluctuation and excitement than the circumstances would ordinarily produce.

Pig Iron.—Considering the curtailment of consumption in the West, the market shows signs of strength. Production fell off between July 1 and Aug. 1 to an extent that would represent 25,000 tons in a month and stocks on hand show but a small increase. If Western furnaces continue in operation at their present rate it is likely but a question of time until this market will be invaded by a part of their product in an attempt to find an outlet. The demand is principally for iron to be delivered within the next 60 days, but few orders being received which extend beyond this period. We quote the following prices for Philadelphia and nearby points: No. 1 X foundry, $15.50 to $16; No. 2 X foundry, $15 to $15.25; No. 2 plain, $14.25 to $14.75; standard gray forge, $13.75 to $14; ordinary gray forge, $13.25 to $13.50; basic (chilled), $14 to $14.25.

Finished Material.—Unless the strike is settled within a reasonable length of time we may yet witness conditions bordering on a famine in certain lines. Plate and bar mills are rushed with orders far beyond their capacity and sheets and structural material command an increasing premium; especially is this the case with the former. The conditions are abnormal and being largely the effect of labor complications they are not conducive to confidence in their permanence. The prices for this vicinity remain about as follows: Plates, ¼-inch and thicker, 1.75c to 1.80c; bar iron, 1.55c to 1.60c; steel bars, 1.60c to 1.65c; angles, 1.75c to 1.85c; beams and channels, 1.75c to 1.85c.

Employers Gain in Chicago Molders' Strike.

Chicago, Aug. 20.—The National Founders' Association has been gaining ground in the local molders' strike. Last week, all the molders employed in the foundries of Vierling, McDowell & Co., Dearborn Foundry Co., Pyott Foundry Co., and the South Halsted St. Iron Works returned to work unconditionally. Conservative men among the strikers, seeing the uselessness of protracting the conflict with their employers and the officers of their own union, have been asserting their influence, and this coupled with the success which the National Founders Association is having in filling the strikers' places, has resulted in many returning to work individually. That the backbone of the strike is broken is admitted and the members of the National Founders' Association have much satisfaction in the good results which have followed so quickly the methods enforced in the last three weeks. The molders that have returned admit that the strike was an ill-advised one and lay the blame for it on certain national and local leaders who opposed the decision of their executive committee. Molders from out of the city continue to arrive and these are put at work as fast as they report.

The report that has been current the past week that President C. M. Schwab, of the United States Steel Corporation, will resign, is denied on good authority. In this connection there has been a good deal of conjecture concerning the relation of the United States Steel Corporation to the Bethlehem Steel Co., of which Mr. Schwab will have control after Aug. 26, but no authoritative statement has been made.

SILICON, SULPHUR AND CARBON IN CAST IRON.

In a recent number of the Journal of the American Foundrymen's Association, the secretary, Dr. Richard Moldenke, has the following review of data presented to the American Institute of Mining Engineers:

Prof. Henry M. Howe, of Columbia University, has studied the above subject thoroughly, and gives his results after analyzing all the evidence presented up to this date. The generally accepted theory that silicon lowers the solvent power for carbon at and somewhat above the freezing point (making graphite at the point of set) having been strongly combated of late, Prof. Howe went to great trouble to examine the evidence, and has arrived at different results than evidently intended by the opponents of the time-honored view of the case. Mr. Bachman's tables in particular, in which the proportions of graphite at first appear to be nearly independent of the silicon contents, show something altogether different. The silicon theory supposes not that the amount of graphite grows as the silicon does, but that the solvent power of the iron for carbon diminishes as the silicon goes up; that is, that the combined carbon grows less as the silicon grows greater. The total carbon is a variable thing, and necessarily with the combined carbon influenced only by the silicon the graphite will be quite as variable. This is exactly the case in Mr. Bachman's results, for his combined carbon drops progressively from .451 to .242 per cent, as demanded by our silicon theory. His other tables show similar characteristics, modified only by the sulphur contents. In all results so far shown the silicon has rather been in the upper ranges, while its influence is very much more powerful in the lower. Prof. Howe now plots the combined carbon, graphite and total carbon of 700 pig irons in a series of tables arranged with reference to the sulphur contents so that this influence is well brought out at the same time. Pig irons with high percentages of manganese and phosphorus were left out, as the results were intended to be comparative. We are especially gratified to see a number of results published by members of this association quoted, notably those of Mr. Keep and your secretary.

The conclusions Prof. Howe arrives at are as follows: (1) In normal and relatively pure commercial pig irons, as the silicon increases the combined carbon progressively decreases; (2) This decrease is rapid at first, especially as the silicon rises from zero to 0.75 per cent, and then slower and slower; (3) This influence of silicon is often marked by that of other variables. No. 2 is original with Prof. Howe. He also mentions that the very strong influence of the very first addition of silicon may be modified here, were results available. In fact most of these results have come from the studies of your secretary on the melting point of cast iron. It may be added that if Prof. Howe would study the "malleable" and the chill roll industry thoroughly he would get much further information strongly corroborating his conclusions. In fact an entirely new factor would be encountered—the size of the pigs—that is, the cooling rate due to the cross sections of the castings made. A thin casting with 1.25 per cent silicon may not show a trace of graphite when cast hot enough. Your secretary's experience with over 100,000 tons of pig iron, mostly with low silicon contents, makes him feel that Prof. Howe is exactly correct when he states that with little silicon its effect on the solvent power of iron for carbon is very great, and it is less the higher the silicon content rises. Perhaps our old-fashioned foundrymen who have always acted intuitively on this point will now feel a sort of satisfaction, and specifications for pig iron may not be burdened with "graphite" requirements.

The annual report of the United States Cast Iron Pipe & Foundry Co. for the fiscal year ending May 31, 1901, does not show earnings. The surplus on that date was $500,360. The balance sheet as of May 31 showed the following: Assets—Treasury stock, $347,555; unissued stock, $5,000,000; sinking fund, $31,797; plant investment, $24,066,941; cash, $260,568; raw and manufactured material, $1,429,868; accounts receivable, $1,854,136; total, $32,990,866. Liabilities—Preferred stock, $15,000,000; common stock, $15,000,000; American Pipe and Foundry Co. bonds, $1,194,000; Anniston mortgage bonds, $105,000; bills and accounts payable, $1,191,505; surplus, $500,360; total, $32,990,866.

THE IRON TRADE REVIEW

Devoted to the Machinery, Metal-Working and Foundry Trade, and Iron and Steel Manufacture.

PUBLISHED EVERY THURSDAY BY

THE IRON AND STEEL PRESS CO.,

ROSE BUILDING, CLEVELAND, OHIO.

G. H. GARDNER, President and Treasurer.
JOHN A. PENTON, Vice-President.
A. I. FINDLEY, Secretary.

A. I. FINDLEY, ... EDITOR.
ROBERT I. CLEGG, . . . EDITOR MACHINERY DEPARTMENT.

CHICAGO: 934 Monadnock Block, GEO. H. GRIFFITHS, Manager.
PITTSBURG: 429 Park Building, A. O. BACKERT, Manager.
NEW YORK: 150 Nassau St., D. C. WARREN, Manager.

Subscription, $3.00 per annum. To Foreign Countries, $4.00.
Advertising Rates Furnished on Application.

The Cleveland News Co. will supply the trade with THE IRON TRADE REVIEW through the regular channels of the American News Co.

ENTERED AT THE POST OFFICE AT CLEVELAND, O., AS SECOND CLASS MATTER

AUGUST 22, 1901.

UNION DISRESPECT FOR OTHER AUTHORITY.

When monarchy began to believe and to teach that "the king can do no wrong" it was not far from its fall. The modern trade union appears to have the same fatuous confidence in its decrees and to assert them against contracts, against decrees of the judiciary, and even against the Federal Constitution itself.

If an existing labor contract which the employer is keeping in every respect, stands in the way of a strike order, unionism, as recently interpreted, insists that the contract must be violated. When all other argument seemed about to fail, the emissary of the Amalgamated Association to the Joliet and Bay View lodges tells us that the men were brought out with the irresistible proposition that "the creator of a contract is greater than the contract." The volume in which this new jurisprudence is to find place should also lay down the doctrine that "the creator of law is greater than the law" and the "creator of wealth is greater than wealth," and by a parity of reasoning all inconvenient obstacles to disorder and larceny would be disposed of.

Of even more serious consequence than this attack on the sacredness of contracts, are the trade unions' utterances against the judiciary and their hostility to the militia. Resolutions criticising judges who grant injunctions against lawless strikers are calculated to beget disrespect for courts and judicial authority and to encourage the mob spirit, to the breaking down of all regard for the restraints of the law. The pernicious idea that as a strike is war any measure which may seem necessary to victory is justifiable, is being more and more openly preached and defended. Intimidation is regarded as one of the weapons which strikers must employ against those who would work, the whole argument shutting out any room for the presumption either that the strikers' demand is wrong or that the union can be wrong in employing any and all means to carry its point.

Similarly the prohibition of membership in the militia is a direct blow to law-enforcement at home and to the maintenance of such a military organization as will ensure to the nation the respect of other world powers. At bottom it is a species of disloyalty that grows naturally out of disregard for contracts and disrespect for courts.

When it is remembered that courts are the machinery for upholding and enforcing law and that militia are employed not against law abiding citizens but against law-breakers, the position of hostility to these institutions which many unions have assumed comes dangerously near anarchy. Some attempts to justify the attacks upon the judiciary have been based on the alleged use of judicial power in favor of corporations and individual employers and against wage-earners struggling for their rights. If the cases were analyzed it would be found that without exception the injunctions issued have not been against fancied attacks upon the rights of others, but against real intimidation of men who would work, who even underwent imprisonment in a shop yard that they might have opportunity to earn their bread. The mistake of the unions in all these cases has been in the assumption that these men had no right to take the places of strikers and that the union was justified in the use of any means whatever to prevent the operation of works its members had left.

It is a long road from the conditions referred to above to the arbitration and conciliation regime of which much has been written and for which many have labored with a worthy zeal. But whether the better way of settling wage troubles, or rather preventing them, comes early or late, it cannot be hastened by contract breaking and violence. We believe the tendency will be to hold labor unions to a more and more strict accountability for their acts. In England, after years of bitter strife, in which unionism became more and more aggressive, a decision has been given recently which makes it possible for employers to obtain damages from trade unions where the organized action of the latter has caused loss of property or damage to business. Experience in this country is already demonstarting the necessity for holding unions to a stricter accountability for violations of contract and for violence and destruction of property.

Tremendous power is wielded by the leaders of large labor organizations, and to a large extent it is irresponsible power—a reversal of the principle that greater power involves greater responsibility. And when to this rapidly increasing power there is given the momentum of intolerance of restraint and of hostility to the very safeguards of our institutions, the condition is one to be viewed with grave concern. While labor leaders will disclaim all partnership with anarchy they should have a care how they sow the seeds of hate and of scant respect for law in a day when the condition of labor is better than in any period in the world's history. Let them make unionism a synonym for contract keeping and order enforcement and they will do much to turn the tide of popular disfavor that has been setting in strongly under the turbulence of recent years.

AKRON, O., Aug. 20.—A small riot was narrowly averted in Barberton at a late hour last night when the striking employes of the Stirling Boiler Works found Daniel Morgan, the offending non-union workman, who was primarily the cause of the strike which was begun Monday at noon. The strikers put the non-union man on a car and accompanied him to the town limits. There they ordered him to keep on going and never return to Barberton under pain of death. He was as-

saulted by some of the more violent strikers and was so badly frightened when he reached this city that he applied to the sheriff for protection.

As long as trade unionism brings forth this manner of fruit, it must expect to be looked upon as a menace to law and order. The will of the union appears to be the supreme law to its members, and neither individual, nor corporation, nor court is to be permitted to stand against it. The day will come when the record of such an outrage as that reported in this dispatch will sound as unreal as some of the stories of slave-day horrors in the fifties. If unionism is to survive it must be purged of this odious denial of manhood rights to every worker who does not choose to come under its power.

EMPLOYERS' AND EMPLOYES' RIGHTS IN PATENTS.

It is not uncommon in American shops to find a willingness, often an eagerness, to further the progress of the business by suggestions looking toward improvement or economical production of the work in hand. The value of the suggestion is acknowledged in various ways peculiar to individual shops, promotion and a cash reward being the usual methods. Sometimes there is a doubt as to the value accruing from a suggestion, and this point is accentuated when the idea is sufficiently novel to warrant application for a patent. Here again comes in another point for consideration as to the ownership of a patent worked out with the aid of the employer.

An interesting case has been heard and decided by the court of appeals at Washington, D. C. It is held that as between an employer and a party employed for a special purpose matters merely auxiliary or tributary to the main invention can give to the employe no claim as an inventor, and in regard to such features as amount to independent inventions a presumption exists in favor of the employer as the author of the same which can only be overcome by conclusive and unequivocal proof. This is the familiar doctrine laid down by Mr. Commissioner Marble in the case of Harrison versus Hogan, and Judge Morris affirms that such a doctrine is a fair and just exposition of the law, and proceeds to state how the court would apply it as follows:

"We do not mean, of course, to be understood as holding or sanctioning the idea that the employee's intelligence is all for the time being given over to the employer, and that the employee retains no independent power of invention. On the contrary, the employee is to be protected from the rapacity of the employer, as much as the employer from the dishonesty of the employee; and if the employee makes an invention wholly independent of the employer, it is the law that the invention belongs to him who actually makes it, and that it does not inure to the benefit of the employer. What we hold is that when in the course of experiment by an employer with an invention a device is suggested for its improvement, which in itself would reach the dignity of independent invention, and a dispute arises between employer and employee as to its conception, the presumption is justly in favor of the employer, and it is incumbent on the employee to overcome that presumption by satisfactory proof."

This seems a reasonable view to take of the mutual rights of the employer and the employe in any question pertaining to ownership of a patent, and places the shop relationship in these matters upon a definite footing.

CONSOLIDATIONS IN EUROPE.

Control, not abolition, is the European policy in respect to trusts, as Prof. J. W. Jenks finds it. As the expert agent of the Industrial Commission, Prof. Jenks has studied thoroughly the conditions abroad and his report goes at some length into the problem as it exists in England, Germany, France and other countries. The prime reason for the formation of consolidations in Europe is found to be identical with that which has operated in the United States—ruinous competition, carried to such an extent that the business is either a losing one or attended with risks far too great for the return. Prof. Jenks's report is far from bearing out the claims of those who glibly load upon the tariff the responsibility for the so-called trusts in the United States. In England, where the movement has reached full flower more complete control of production appears to be aimed at than in many of the Continental trusts. Without doubt the report lends color to the belief that a considerable measure of monopolistic control is an essential feaure of a successful trust. The conclusions of Prof. Jenks's report are summarized in five paragraphs:

1. There is, relatively speaking, little objection to combinations in Europe, and in some countries the governments and people seem to believe that they are needed to meet modern industrial conditions. They do believe that they should be carefully supervised by the government and, if necessary, controlled.

2. There is little or no belief that the protective tariff is responsible for their existence. It is known that they at times use the tariff to keep their prices higher than would otherwise be possible, and that their export prices are often lower than their domestic prices. The tariff should be guarded so as to prevent serious abuses, but there is practically no thought of its abolition.

3. Railroad discriminations have been practically abolished in Europe, and in consequence they have had no effect toward creating combinations.

4. The great degree of publicity in the organization of corporations has largely prevented the evils arising from stock watering, and has evidently had much effect in keeping prices steady and reasonable and in keeping wages steady and just.

5. There seems to be no inclination toward the passage of laws which shall attempt to kill the combinations. That is believed to be impossible and unwise. Laws should attempt only to control, and that apparently chiefly through publicity, though the governments may be given restrictive power in exceptional cases.

Bethlehem Steel Co. Transfer.

At a meeting of the stockholders of the Bethlehem Steel Co. at Philadelphia, Aug. 16, it was decided to ratify the purchase of the Bethlehem Iron Co. and to issue $7,500,000 of bonds, the purchase price of the iron company. There was not a dissenting vote, 236,443 shares out of a total of 300,000 being represented. It was authoritatively announced that within 10 days the control of the Bethlehem Steel Co. and the Bethlehem Iron Co. will be assumed by President Schwab, of the United States Steel Corporation. Mr. Schwab holds an option on the stock of the companies at $24 a share, which expires Aug 26. More than 240,000 shares out of a total of 300,000 are now in the vaults of the Girard Trust Co., which acts as trustee in the transaction. Joseph Wharton, one of the principal owners of the stock, said: "I do not think the United States Steel Corporation will get control of the properties. Neither do I believe that the plants will go to the Vickers-Maxim-Cramps interests. I don't think Mr. Schwab himself is certain yet what he will do with the plants." Robert P. Linderman, president of the Bethlehem Steel Co., said: "Without any positive knowledge, from what I have heard I am led to believe that there is a plan to join the Bethlehem in a shipbuilding combine which is to take in the Union Iron Works, the Nixon Shipbuilding Co., the Newport News concern and Harlan & Hollingsworth, but neither the Cramps nor the New York Shipbuilding Co."

STRIKE DEVELOPMENTS OF THE PAST WEEK.

PITTSBURG, Aug. 20.—Today two additional departments of the National Tube Co. were closed, the men refusing to work skelp which they claim was rolled in the plants of the Carnegie Steel Co. The men employed at the Continental plant walked out last night while the Pennsylvania Tube Co. plant was closed this morning. Both these plants have heretofore been non-union and only recently did the men become affiliated with the American Federation of Labor. The United States Seamless Tube plant of the National Tube Co., located at Christy Park, McKeesport, Pa., was closed last week, the men walking out in sympathy with the Amalgamated Association employes who struck two weeks ago.

The men employed both at the Bay View, Wis., and Joliet, Ill., plants of the Illinois Steel Co., after meetings lasting several hours, decided to obey President Shaffer's general strike order. Assistant Secretary M. F. Tighe of the Amalgamated Association was delegated to bring them back into line. At South Chicago his efforts to induce the men to strike were unavailing in spite of his threats to take their charters away from them. The constitution of the association provides that no charter can be taken from a lodge without a trial.

The reason for delegating Assistant Secretary Tighe to whip the western men into line is stated by one of the members of the association. Mr. Tighe is ambitious and hopes to succeed President Shaffer as president of the association. At the last convention he had the entire support of the Wheeling delegation. It is alleged that President Shaffer urged him to go to the Chicago district in view of the desperate situation developed there and there was no sorrow in the Shaffer camp over the outcome at South Chicago. But there was a change of demeanor when the reports from Joliet and Bay View were received. Tighe is now a bigger man in the association in the estimation of the members than President Shaffer, and the breach between the two factions has grown wider. Should the association be in existence after this strike, it is almost a certainty that Mr. Tighe will be elected President Shaffer's successor.

While the Amalgamated Association has been making gains at the plants of the Illinois Steel Co. and the National Tube Co., the United States Steel Corporation has succeeded in resuming operations in full at the Painter and Clark mills of the American Steel Hoop Co., while the Lindsay & McCutcheon plant has several mills in operation. At Wellsville, O., the strikers have clashed with the authorities on several occasions. Some of the men were arrested and heavy fines were administered.

One of the ironies of the strike was the sending of a marked copy of the Constitution of the United States to Mayor Black of McKeesport by Edmund C. Converse of the National Tube Co. Mr. Black has not distinguished himself during the week by any of the utterances which won for him so much notoriety not only in McKeesport, where he is the chief executive, but throughout the country as well.

One great disappointment to the Amalgamated Association was its failure to organize the men in the Carnegie plants. It is claimed that several small lodges have been organized, but thus far they have not been heard from.

While the calling out of all the Amalgamated members in the plants of the United States Steel Corporation is no doubt a great showing of strength, labor leaders generally consider it a short-sighted policy. The contributions of these men who have been called out in the past ten days would no doubt have helped greatly to replenish the "protective" fund, but instead they will draw therefrom.

On all sides the question of the duration of the strike is asked. The present status of affairs would indicate that it will not be effectively broken before Oct. 1. After that date it is almost a certainty that the men will flock back to the mills and President Shaffer and his official staff will not be able to prevent the stampede.

Operations have been resumed on a few of the mills of the Monessen, Pa., plant of the American Steel Hoop Co., and as the men there are said to be disaffected already it is probable that they will return to work shortly.

The Crescent tin mill of the American Tin Plate Co. at Cleveland, O., has also several mills in operation while preparations are reported under way at Canal Dover, O., and at the Star plant, Pittsburg, for an early resumption.

Chicago Steel Workers Defend Contract-Keeping.

A statement addressed to labor organizations and to the public, signed by 14 men who claim to represent the members of the Amalgamated Association, employed in the steel works at South Chicago, was issued at Chicago Aug. 20. The statement is an extended argument in justification of the refusal of the South Chicago men to violate the contract with the Illinois Steel Co., which specifically provides that the wage agreement can be broken under no circumstances except by either party to the agreement giving three months' notice of its intention, the notice to be given previous to Oct. 1.

The statement quotes a decision rendered in 1897 by M. M. Garland, then president of the Amalgamated Association, disavowing the action of certain rail straighteners who sought to violate a similar contract with the Illinois Steel Co. It also quotes statements heretofore made by President Shaffer of the Amalgamated Association and John Mitchell, president of the United Mine Workers, upholding "the sacredness of labor contracts." In conclusion the statement says: "After taking legal advice we feel certain that President Shaffer's claim that our contracts are void because the Illinois Steel Co., with whom our agreement was made, has been absorbed by the United States Steel Co., is without foundation.

"The principles of union labor are as dear to us as to any men in the country who earn their living by honest toil, but we do not think we should be expected to violate every rule of business integrity and personal honor for a matter of sentiment, for this is a time when we must not let our sympathy get away with our better judgment. It may not be generally known but the fact is we were supported by our district vice-president in our action in refusing to strike."

American Shipbuilding Co.

The annual report of the American Shipbuilding Co. for the year ending June 30, 1901, is very favorable. The financial statement is as follows: Resources—Plants and property, $14,633,683; additions and improvements, $359,613; material on hand, $549,315; accounts and bills receivable and cash, $1,976,155; work under construction, bal. due, $1,187,544; total, $18,706,312. Liabilities—Preferred stock, $7,900,000; common stock, $7,600,000; accounts payable, $1,214,008; bills payable (since paid), $250,000. Earnings were $1,998,542 from which $553,000 dividends were paid. The balance, less $271,904 depreciation and maintenance, plus $568,665 previous surplus, makes the surplus June 30, $1,742,303.

President W. L. Brown says: "The business of the company for the past 12 months has exceeded in volume that of the previous year and the prospects for the coming year are favorable. All the property and interest of the company are free from mortgage or incumbrances of every kind except $150,000 purchase mortgage on the Buffalo plant. During the year the company has acquired by purchase without increasing its capital stock the two dry docks, construction plants, machine shops, etc., of the Union Dry Dock at Buffalo and leased the real estate, with options to purchase on terms favorable to the company. All the company's property has been kept in the best condition and the plants are fully up to standard and equipment in every respect.

"The number of vessels built during the year was forty, with a carrying capacity of 191,000 net tons. There are 21 vessels under construction and 847 vessels were docked for repair. During the past year contracts have been secured for the construction of 11 vessels suitable for salt water service. Four of these are now engaged in trans-Atlantic trade."

A report was circulated last week that the Republic Iron & Steel Co. was about to be absorbed by the United States Steel Corporation. Nothing could be further from the truth. If there were no other reason, the United States Steel Corporation has enough Amalgamated Association on its hands at present without being compelled to take on more trouble by the absorption of the Republic plants, which are all thoroughly organized.

AWERICAN BOILER MANUFACTURERS' ASSOCIATION.

Our report of last week brought the proceedings of the Buffalo convention of the American Boiler Manufacturers' Association through Tuesday's session. President Hammond called the convention to order on Wednesday morning and the secretary, J. D. Farasey, announced the death of P. J. Walsh, of Walsh & Weidner, Chattanooga, Tenn. The president appointed the following members as a committee to prepare resolutions on the death of Mr. Walsh: E. D. Meier, Geo. N. Riley, Jos. Lappan and J. F. Casey. The resolutions were subsequently submitted and adopted by a rising vote.

The auditing committee reported that they had examined the books and accounts of the secretary and treasurer and found them correct. The report was adopted.

Mr. Rees, of Toledo, reopened the discussion of the previous day relative to the government rules for the inspection of marine boilers, and he was followed by S. Taylor, of Hoboken N. J., who averred that his experience had been a very annoying one. Yet he was of the opinion that anything in reason asked by the association would receive favorable consideration. The discussion was continued by J. F. Casey and J. J. Main. The latter suggested that the secretary notify the members of the discussion and the action of the association. The suggestion was adopted and the topical questions were then taken up for consideration.

J. Don Smith, chairman of the committee on topical questions, again brought up the consideration of the best forms of annealing and riveting furnaces. Thos. M. Rees, of Pittsburg, detailed his experience in this line and proffered the use of drawings and blue-prints to his fellow-members. Messrs. Connelly, Main, Hammond, Casey and Hartley participated in the discussion which brought out many practical suggestions on the construction and maintenance of furnaces.

H. J. Hartley, ex-president of the association, read the following paper dealing with interesting and humorous reminiscences of the old-time methods of boiler construction:

The Past and Present of Boiler Manufacture.

In presenting this paper, it is not my purpose to advance any special ideas on the art and science of constructing steam boilers, but merely to indulge in a few generalities on the subject in the line of comparison between the past and the present.

Would it be amiss to become reminiscent? If not, I place myself in the boiler shop of 40 years ago, and I behold a low shed, with a flooring of mother earth, this latter consecrated by the boys as a burial place for numbers of burnt rivets. And wasn't the shop smoky? The rafters were covered with a thick coating of soot, which resulted ofttimes in more than an argument on the part of the men, when it was found necessary to put up a block and tackle to lift rims up for connecting with others. Certainly whoever did it could be called "smut-faced" for the rest of that day. This block and tackle, by the way, was one of the first requisites of the shop; it was the crane of the day, lifting plates under punches, on to flange fires, and miles of cylindrical boilers high in air over stakes, where men on precariously constructed scaffolds drove cold ⅝ rivets with sledges. No doubt the reason that most of you are now listening to me with your eyes, instead of ears, is due to having stood at the end of these cylinders hung over stakes, the noise from them being greater in volume and velocity than that given by a modern 15-inch gun.

The rest of the shop equipment scarcely gives me a paragraph, but picture to yourselves the one punch, the four-foot rolls, the bellows and forge, and all the tools of that time have been mentioned. But don't overlook the block and fall, it helped materially to lift us into the present. And the men, good all-around boiler makers every one, would cheerfully and with more zeal than was commendable, keep putting in braces, in a wagon-top marine boiler, until they were hopelessly entangled, necessitating the undoing of some of their work to allow of their escaping. In those days every man had his own kit of tools, 'tis true, replenished from time to time by a search through the shop for unmarked ones belonging to others—custom making this an honorable vocation. But notwithstanding the drawbacks the work was gotten out expeditiously; neither the strength nor skill of the men was overtaxed by the necessities of the times, and good prices were realized. Competition was not so keen. To almost every shop belonged a certain radius of surrounding miles from which to draw the business. Boilers in transportation did not pass each other on their way from coast to coast as they do now, nor did the business occupy the place in engineering science in which it stands today. In fact, drawings for the boiler shop were considered superfluous. If one by accident found its way there, it generally proved a puzzle and an object of dismay; but in the corner back of the layer-out's trestles was an immense pile of strips, templates, etc., that represented every tank, smoke pipe, and boiler ever constructed in that shop, each template marked with white lead to correspond to a memorandum in a brown paper backed book carried by the layer-out. Frequently one side of the pages in this book exploited the benefits derived from using stomach bitters or soothing syrup. The foreman in those days was usually the most skilled workman in the shop, having graduated through the various stages of apprenticeship from rivet heater to flanger, which latter was usually the highest paid workman. He was supposed to, and often did, perform the most difficult jobs that came into the shop. His ability to get work accomplished quickly depended largely on the confidence in his workmanship inspired in the minds of his men and the example he set. His sanctum was a little office in one corner, the two sides looking into the shop being enclosed to permit his surveying his smoky domains, due to the flange fire at the other end of the shop pouring out its volume of inkiness. At a certain time in my existence it seemed to me that all he could see was the pyrotechnic display of a myriad of stars ascending from the rivet heating pot, whilst the boy fished in vain for the lost rivet that was rapidly disappearing into the air, to the accompaniment of the double rattle of the riveter's hammer calling for one "spitting hot."

All this represents the past, nor is it as exaggerated as our present would lead us to think, if most of us had not passed through it all. But it was a step in the successful evolution leading to the present. If we forget the intervening steps, our business today must seem like the realization of a fanciful dream.

We pass from the old shop to the new, and are confronted by an immense roomy steel structure, well windowed and high roofed, every nook and corner indicating thought and well conceived intention. The floors of many of these shops are now of cement, so graded as to drain into sanitary arranged sewers. Fires are properly hooded to convey away all smoke and gases. Large tools, electrically, pneumatically and hydraulically driven, are so placed in positions as to afford every facility for the rapid handling of work. Powerful and gigantic cranes pick up and whirl from end to end of the shop complete boilers of a weight and size that causes the uninitiated to stare in amazement. Multiple spindle drills and punches, ingenious machines that cut out elliptical shaped manholes, planers, rolls, flanging and riveting machines, convert the largest size and heaviest sheets made into the intricate shapes and designs that go to form a modern boiler. The old-time foreman is displaced by a superintendent, with a corps of assistants, including draughtsmen, foremen, layer-out, etc., and the boiler is fully constructed on paper before the work commences in the shop. Furnishing estimates involving in one proposition thousands and thousands of dollars has become an art, entailing a thorough knowledge of prices of material in the iron and steel market, and intuition regarding possible fluctuations in costs, time of delivery, etc.

The successful superintendent who is doing this today is frequently selected from among those technically trained, whose knowledge of matters pertaining to his business outside of the shop must equal that of his grasp of affairs on the inside. Indeed, his success is only limited by his abilities as a mechanical engineer, with the possibilities of the future unlimited.

In conclusion, may we not, with pardonable pride, both individually and as an association, accept credit for this revolution in methods in our trade. Individually, every boiler manufacturer has added his atom of progress; collectively, we as an association have reached an age which, accompanied by our achievements, permits a modest expression of self glorification. It cannot be gainsaid that the formulation and

adoption of a quality of materials embracing advanced chemical and physical properties, has been a widespread benefit, acquainting the steel and iron manufacturers with our views, resulting in a uniform output from the mills. This must have been of inestimable value to them, as previous to our organization we all held individual ideas as to quality of materials, thus entailing upon the steel manufacturer the making of many brands. And I speak with positive knowledge of the fact, that the number of boiler makers in this country (not members of our association) who follow in our lead, by embodying in their specifications our standards, is as surprising as it is gratifying. In this respect the admirable work which we are accomplishing unknowingly is, in our modesty, not given its true value. These remarks may also well apply to our boiler specifications. Even if there be some fellow manufacturer unwilling to accept our high standard, the prospective purchaser, in his search for information, very often obtains our requirements and insists on their being complied with. Again when engineers are requested to furnish plans and specifications to steam users, it will be frequently found that our good precepts are embodied therein. Therefore, congratulations may come easily to the association, if not for the quantity of good performed, for the quality. And I would personally extend to the members of the association my heartiest appreciation, not only for the advantages I have derived in the search for knowledge and information pertaining to my business, but also to the nearer relation into which it has brought me socially with representative men, so closely following the same walk of life.

Officers for the New Year.

The committee on time and place of next meeting reported that Atlantic City, N. J., had been selected, the date to be left to the discretion of the local committee. The report was adopted.

The committee on nomination of officers reported the following who were elected unanimously:

President, Richard Hammond, Buffalo.
Secretary, J. D. Farasay, Cleveland.
Treasurer, Jos. Wangler, St. Louis.
First vice-president, John O'Brien, St. Louis.
Second vice-president, R. Munroe, Pittsburg.
Third vice-president, Samuel Borger, Columbus, O.
Fourth vice-president, J. M. Robinson, Boston.
Fifth vice-president, M. F. Cole, Newnan, Ga.

An invitation was received from the Louisiana Purchase Exposition inviting the association to meet in St. Louis in 1903; and a resolution endorsing the World's Fair to be held at that city and selecting it as the meeting place in that year was offered and referred to the annual convention of the coming summer for action.

In attendance upon the convention were the representatives of the various companies enumerated in last week's issue, with a liberal representation of supply houses. The firm of Jos. T. Ryerson & Sons had a very large exhibit of models of shears, braces, riveters, calkers and drills, with photographs, arranged in one of the parlors of the Iroquois Hotel.

On Wednesday evening a theater party was arranged for the members, ladies, and guests and Thursday morning the steamer America took the party down the Niagara river to the Falls, where lunch was served at Hotel Dufferin, Victoria Park, Ont. Subsequently cars were taken for a trip through the gorge route and the party returned by street cars to Buffalo. In the evening a banquet was tendered the members, ladies, and guests at the Iroquois Hotel. John T. Norton, Troy, N. Y., acted as toastmaster, and the following gentlemen responded to toasts: J. Francis Burke, Pittsburg, "How Unity of Effort Moves the World. D. P. Jones, past engineer, U. S. N., Pittsburg, "Boilers as Factors of Our National Defense." James Lappan, of Pittsburg, retold his famous "horse story."

The following were elected to membership in the association: J. R. Vance, president of the Vance Boiler Works, Geneva, N. Y., and J. S. Schofield, of Riter Bros. & Co., Buffalo, N. Y.

The Wright Iron Works at Newburg, N. Y., will shortly resume operations. The present owners are asking $97,500 for the entire property, while prospective purchasers say that they will pay $75,000 for the plant and place it in operation again provided the citizens of Newburg will pay the remaining $22,500.

THE GROSLEN REDUCING VALVE.

The Croslen Mfg. Co., LaSalle St., Chicago, makes a simple pressure regulator which can be used for steam, air, water or gas. The device is automatic and is shown in elevation and vertical section in Figs. 1 and 2, respectively. Fig. 2 illustrates a diaphragm above and another below the disc valve; these are connected by a yoke or saddle which straddles the end of the tube leading to the outlet. Above the upper diaphragm is a spring regulated by a knurled screw at the top of the valve and adjusted according to the pointer and scale, seen to greater advantage in Fig. 1. On the bottom arm of

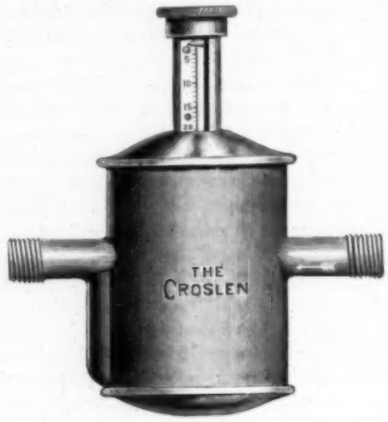


FIG 1.—ELEVATION OF CROSLEN REDUCING VALVE.

the yoke is mounted the disc valve which acts upon the delivery pipe according to the spring adjustment. The tube at top of valve chamber is graduated on the outside with a pressure scale, and an indicating finger shows the pressure for which the valve is adjusted.

When the index has been set for the desired delivery pressure, the valve will maintain this tension regardless of the initial pressure of the gas or water. The operation will be understood by following the course of the fluid after passing the valve disc. The pressure is then applied to the under side of the lower diaphragm tending to close the orifice of the de-

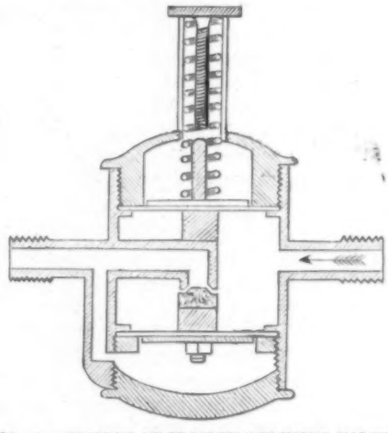


FIG 2.—SECTION OF CROSLEN REDUCING VALVE

livery pipe. The amount of compression applied to the spring above the upper diaphragm determines the extent to which the disc valve will reduce the opening. The initial pressure is balanced by being delivered betweeen the two diaphragms and the pressure in the outlet is opposed by the spring only; thus the pressure reduction is dependent upon the adjustment of the upper spring. The valve will work upside down or in any position desired without affecting the action.

The Susquehanna Iron & Steel Co., with offices at Philadelphia, has orders closed that will keep the plant in full operation until November. The Vesta Furnace operated by the company is out of blast while the Aurora furnace was blown in last May after an idleness of nearly a year.

The new steam forge of the Reading Iron Co., on North Ninth St., Reading, Pa., was placed in operation last week. The old forging plant will now be removed.

CLEVELAND DISTRICT AND WORLD COMPETITION IN IRON-MAKING.

The historic Cleveland district, England, has been under discussion recently in iron and steel journals. The question has been raised as to its ability to maintain its position of prominence in iron manufacture in the face of the exceptional development of the resources of the United States and Germany. The possibility of building up a steel industry on the Tees, based on Cleveland district ores. The acid Bessemer process has flourished in the Cleveland district for years, but it requires imported ores. Cleveland pig iron can be made cheaply. Concerns owning their own iron mines and having Durham coal fields close at hand, and then own limestone beds and coke ovens, have been able, as Chas. Kirchhoff, editor of the *Iron Age*, wrote last year, in his European letters, to produce pig iron at a cost of $7 a ton, which might be further lowered by the introduction of by-product coke ovens. He concluded that the Cleveland district, with others in England, and with the Minette district on the Continent, is to be considered a competitor with Alabama, the Lower Lake district, Pittsburg and the Valleys.

The London *Iron and Coal Trades Review* has had letters recently from Messrs. Pease and C. E. Muller, on the prospects of the Cleveland district. Some of the facts brought out in the discussion were not entirely encouraging, the one great factor of doubt being the probable duration of the ore supply. Of the efforts at the Clarence works at Middlesbrough to establish basic steel manufacture, using pig made from treated native ores, the outcome is said to be full of promise. Reviewing the discussion the journal referred to makes the following comment on the situation:

"It is the fact that the future of Cleveland is seriously darkened by the exhaustion of the bulk of the really valuable ironstone, and is it the fact that the future of Tees-side is prejudiced by the want of adequate shipping facilities? For the last half century it has been generally believed that in the Cleveland district we possess a reserve of ironstone which is probably equal in volume to any in the world, and has been computed at over 5,000 million tons in all. This ironstone *per se* has, of course, hitherto been more or less unsuited to make steel of any sort because it has too much phosphorus for acid or ordinary steel, and too little phosphorus and manganese, and too much silica, for the basic steel industry. In order, therefore, to adapt the material to steel-making at all, it has been necessary to add manganiferous and phosphoric materials, including a heavier lime burden which increases the consumption of coke, and hence the cost of producing basic steel has been materially increased, the present increase varying from 4s. 6d. to 6s. 6d. per ton, which, of course, is almost prohibitive. This branch of the steel industry, for which Cleveland otherwise appears to be admirably fitted, has, therefore, made comparatively little progress during late years. Although the basic steel industry was practically started in Cleveland, the total basic steel output of that district does not exceed 250,000 tons, whereas Germany produces over five million tons, and the United States will probably, in 1901 produce from 2,500,000 to 3,000,000 tons.

"At the Clarence Ironworks, Middlesbrough, the difficulties in the way of advantageously making use of the basic steel process are now believed to have been solved, and a large plant has been put down to produce such steel in accordance with a new system which will probably extend, and under which Cleveland should be able to compete in cost with any district in Europe, if not also with the cheapest steel-making district on the other side of the Atlantic. It is certain that no other steel-producing district in the world has materially cheaper ores and fuel close to tide-water. Lloyd's Register has now accepted this new material for shipbuilding, hence the dependence of the British steel trade on foreign ores has probably, to a large extent, disappeared, and Cleveland steel from Cleveland ores has now the prospect of becoming a reality on a large scale. Even the Alabama Works cannot much excel in cheapness steel-making pig at 30s. per ton, which is not only an attainable figure but one of which this country has had actual experience in the past.

"After all, however, the crux of the matter lies in the question raised by Mr. Pease as to the duration of the supplies of ironstone of good quality. If this stone is approaching exhaustion, and if there is no probability of new sources of supply, and if there is a likelihood of an increasing scarcity—or at least a higher price—of coke, the outlook is by no means so satisfactory as we should wish it to be, and in such a case the question arises whether it is worth the while of the North-eastern Railway Co. to provide increased dock accommodation at Middlesbrough or elsewhere in the Tees-side district."

TRADE PUBLICATIONS.

"How to Become a Good Mechanic." By John Phin. Second edition, 68, 5 x 7¼ pages. Price 25 cents, paper. The Industrial Publication Co., New York. This is the revised and enlarged edition of a little work first issued in 1883. It has been written for the use of those students who are endeavoring to follow a course of study without a teacher, and the author discusses the questions incidental to the difficulties to be met and how to overcome them, as well as what the student should study and how he is to set out: in short the book is an incentive to self-help on the part of those beyond the reach of a good technical school and to this class Mr. Phin especially addresses himself.

The Jeffrey Mfg. Co. of Columbus, O., is sending out a 3½ x 6 pamphlet, giving a a general idea of the line of machinery manufactured by this firm. Circular 63, as it is termed, is crowded with half-tones of coal and ore conveyors, elevators and washers, cutters and drills, electric locomotives, chemical works, canning and packing house conveyors, bucket, endless pan and apron, steel and cast iron conveyors, etc., etc.

The Standard Tool Co. of Cleveland has a new catalogue, 4½ x 7, 223 pages. The book is profusely illustrated with the extensive assortment of twist drills, reamers, chucks, spring cotters, taps, flat spring and riveted keys, milling cutters and special tools. A description of the Standard twist drill grinder is given. This tool will grind drills at the usual 59 degree angle, but is also capable of grinding drills at a wide range of angles above or below 59 degrees, and by means of a simple adjustment more or less clearance can be given to the cutting lips of the drills. A number of tables of useful information are incorporated in the book relative to speeds and sizes of drills, standard threads and miscellaneous metric measurements, etc.

The Lane & Bodley Co. of Cincinnati, O., is sending out the 50th anniversary edition of the catalogue, 6 x 9, descriptive of the 20th Century engine. This engine has been described briefly by our correspondent at the Pan-American Exposition and the catalogue goes more minutely into the constructive details which are illustrated with half-tones and line engravings.

A 7 x 9, 28 page catalogue has been sent out by the Loomis-Pettibone Co., New York, devoted to the gas plants operating on that system and using bituminous or anthracite coal, wood or its refuse, coke and peat. A number of views of water gas plants, forge shops, tube works, concentrating mills, operated by gas engine, tempering, brazing, etc., are given in interior half-tones of shops in which the Loomis-Pettibone system is in use.

A neat standard size, 6 x 9, catalogue has been issued by the Empire Engine & Motor Co. of Orangeburg, N. Y. The pneumatic motor chain hoists, drills, reamers, center grinders, portable winches and hoisting engines are illustrated by half-tone and line engravings showing the tools in operation, as well as in the detailed reproduction of many sectional views. The pneumatically driven center grinder is quite a novelty: it fits any tool post and has provision for immediate and accurate adjustment to the regular angle for lathe center grinding.

Catalogue C is being sent out by the Rockwell Engineering Co., Cortland St., New York. It is 8 x 10, 37 pages, filled with full-page illustrations of furnaces for oil, coal or gas fuel. An extensive line of annealing, hardening, brass and copper scrap melting, riveting and brazing furnaces of every type, single, double or triple, revolving, portable, etc., are set forth in admirable typography and artistic half-tones.

The charcoal furnace of the Gaylord Iron Co. at Detroit, Mich., has been blown out and is not likely to again make pig iron. The furnace was in operation for 15 weeks during the first half of 1901.

RECENT INVENTIONS.

SCREW-CUTTING ATTACHMENT FOR LATHES.—A patent has been allowed L. J. Monahan, of Oshkosh, Wis., on a device for cutting threads without stopping on reversing the lathe. The arrangement shows a worm wheel meshing into the lead screw and turning on a stud attached to a pivoted casting on the apron of the lathe carriage. The cam lever operating the half-nuts in the apron, has a projecting end fitted to slots in a friction plate or disc which turns, by means of a spring washer, with the worm wheel, the number of teeth in the worm wheel being a multiple of the pitch of the lead screw. In operation the pivoted casting is moved to bring the worm wheel in contact with the lead screw and fastened in position. When a cut has been made over the work resting on the centers of the lathe, the cam-lever disengages the half-nuts and the carriage is run back by hand to the starting point; during this movement the worm wheel and lead screw act as a gear and rack, and the device will not permit the cam-lever to throw in the feed until the exact point is reached where the projection will drop into the slot in the friction disc when the tool will be in position to track in the previous cut.

MATERIAL FOR PROTECTING SHEETS, ETC., IN TINNING.—John A. Kyle, Pittsburg, has patented a material for use in coating sheets with metal. It consists of one or more fatty acids, as for example palmitic acid, solidifying at or above 68 degrees Fahrenheit and practically non-oxidizable by atmospheric air at the melting point of tin; and a solvent of the acid, as a petroleum product for instance.

CUSHIONED DRIVING DEVICE.—T. Oldfield and J. A. Schofield have a method of transmitting power by means of a tee-piece, at the end of one of the two shafts, this is bored at right angles to the shaft and a plunger is loosely fitted to each hole. The plungers are forced outwardly by springs against inclined surfaces on the inside of a pulley attached to the other shaft. When a sudden strain comes on the transmitting shaft, the springs compress and the plungers slide up the cam surfaces instead of conveying the shock directly to the driven shaft.

ENGINE LATHE.—This is patented by C. W. Nitterauer, Duluth, Minn., and shows a headstock pivoted upon the bed and resting in segmental grooves in which ribs of a similar shape are fitted. A shaft passes through the pivot, upon which the headstock turns, connecting the lathe spindle with the feed mechanism so that the lathe can be swung around in a horizontal plane without disconnecting the gearing. A pendulum-lever is provided so that the feed-gears may be thrown in or out of mesh at pleasure.

GOVERNOR.—Edgar P. Coleman, Chicago, has a peculiar modification of the common conical-pendulum governor. The arms are obliquely pivoted upon the rotating main spindle and the two balls are disposed in such horizontal planes that their centrifugal forces are opposed. The links are coupled to a slider on the main spindle bearing a weight or flywheel. The movement of the governor balls up and down not only lifts the weight but rotates it; thus introducing the flywheel action or inertial weight.

MOLD FOR MAKING CHILLED ROLLS.—The mold, patented by Frank Gorman, Mount Oliver, Pa., has an internal removable mold-section and an external tubular casing with an interposed space for the circulation of water. Supply and exhaust pipes communicate with the top and bottom of the water space so as to cause the upward flow of a current of water. The mold section has an interior roughened surface and an exterior surface provided with vertical grooves and annular slots to form the water jacket.

ROLLING MILL.—Robert H. Snyder, Worcester, Mass., has an improvement, recently patented, in a series of lugs or projections on the inner, vertical face of the horizontal side plates over the carrying rolls. These are to hold the outer, and upper, corner of the ingot in turning it with the usual appliances.

WELDING.—The patented process of B. R. Thomas, Rossville, Tenn., consists in cleansing the surfaces and then heating the metals to a red, after which the heated portions are subjected to a welding-powder composed of carbonate of iron, steel-dust or cast-iron filings, pulverized glass, pulverized borax, prussiate of potash, muriate of ammonia and pulverized resin: the treated metals are then brought to a white heat and finally subjected to a continuous pressure. This welding compound is said to have "the properties of promoting fusion, producing softening and also promoting hardening and preventing disintegration of the metals during and after the cooling thereof."

Automatic Machinery and Hand Workers.

It is frequently urged that the introduction of the automatic machine has restricted the employment of the hand worker, and has lessened the individuality and diminished the personal initiative of the operator; that it has had the effect of changing the intelligent, self-respecting hand worker into a mere mechanical adjunct of the machine whose operations he supervises. The automatic machine has, of course, produced a re-arrangement of the avenues of labor, with consequent suffering to those who, through lack of intelligence or lack of adaptability, have been unable to adjust themselves to the new conditions. Such is the necessary effect in transition periods. The suffering and hardship during the transition from the tool age to the machine age have been insignificant when compared with the enormous increase of comfort and general well-being which have resulted from this change.

That automatic machinery has had the effect of diminishing the individuality and personal initiative is wholly improbable. If the slow molding of ages, the heredity of generations, and the environment of art, science, and literature can produce a type of men having little or no imagination, individuality, or personal initiative, it would certainly seem that they are of too resisting fibre to be affected, either for good or ill, by a few years' contact with machinery. Such a type, doubtless, performs valuable functions in the economy of the race, by conserving the good of the past and steadying the present. Nature, which has so carefully preserved this type, can be relied upon to still guard and keep it, to act as a balance weight during a few more epochs. To one, however, who has the slightest spark of the living fire of imagination, an automatic machine is a liberal education and an inspiration, the daily association with which must of necessity augment his knowledge, cultivate his perceptive faculties, and stimulate his intelligence.—[W. H. Smyth in Cassier's Magazine.

Contrasts in Union Usage on Contract-Keeping.

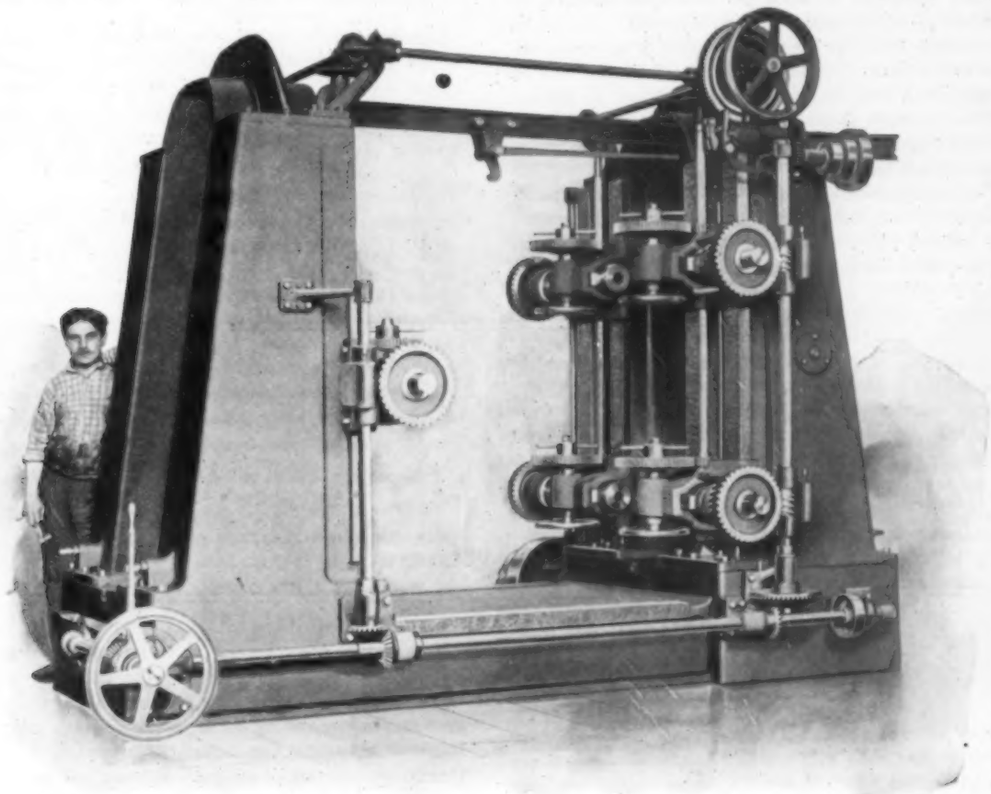
President John Mitchell, in an article in the current number of the New York *Independent*, makes claims for the contract-keeping characteristics of trades unions that are lofty when compared with the record of the Amalgamated Association since it entered upon the present strike. President Mitchell and the steel workers of South Chicago are of one mind, and the declarations of the one and the action of the other are in sharp contrast with President Shaffer's easy violation of a contract that should have been as binding as any his organization ever entered into. President Mitchell's words are in themselves a severe commentary on the faith-breaking that is a foremost feature of the present contest:

"The constitution and laws of nearly every labor organization make it an offense punishable by expulsion for any member to violate a trade agreement or even by subterfuge to evade any of its provisions. The officers of the trade organizations of the present day recognize the great responsibility resting upon them and they are few indeed who dare, even if they were so inclined, ruthlessly to disregard the sacred obligations of a contract. I know of many instances where contracts which were in conflict with the constitution and laws of trades unions have been entered into with employers, and yet the officers and members of the trade organizations have insisted that the contracts superseded the constitution and laws, and took precedence of them; in fact, I recall several specific cases where the members of a local union connected with a national organization went on strike for the purpose of enforcing a higher rate of wages than was provided for in the contract made between the national organization and an employers' association, in which the officers of the national union promptly filled the places of the strikers with other men in order that the union could not be charged with or convicted of breach of faith."

SIX-SPINDLE BOILER DRILL.

The six-spindle semi-automatic machine illustrated in the half-tone engraving is designed for boring three-port U-shaped boiler sections, a work it is capable of performing at the rate of from 6 to 10 sections per hour. The spindles have three changes of speed, with three changes of feed for each speed, and are provided with both hand and power feed, quick advance and return, automatic stop, fine adjustment, and independent feed, and are so arranged that any or more spindles may be thrown out of service without affecting the operation of the others, and so that each may be set to feed from any point within its range.

The heads are designed so that the spindles are supported close to the work, thus conteracting any tendency for the cutters to be deflected from truth. The two lower right-hand heads are made fast to their respective housings, while the four remaining ones are adjustable vertically by means of screws operated by a crank wrench. Two of the housings are secured to the bed-plate and two to a saddle made to adjust horizontally, either by hand or power. A pilot-wheel, located so as to afford an unobstructed view of the work, controls simultaneously all spindles in engagement.



SIX-SPINDLE BOILER DRILL.

The boiler sections are brought to the machine in a vertical position on a truck running on a track passing under an I-beam which extends out to the right of the machine. On this beam is a trolley operated by a lever, by means of which the section is lifted up and run into its jigs when the tightening of four set screws and a nut secures it in position for machining. The spindles are then advanced to the work, when the operator throws in the feed worm and waits for the machine to trip, after which he withdraws the spindles, pulls down on the elevating lever, and runs the work out, when the truck is pushed a few inches forward or back and the operation repeated on the next section.

The general dimensions are: Diameter of spindles, least section, 3 inches, with No. 16 B. & S. taper. Distance from foundation to highest point of machine, 9 feet 1 inch. Floor space required, exclusive of trolley beam, 12 feet 9 inches x 9 feet 4 inches. Approximate weight, 22,500 pounds. The machine is built by the Bickford Drill & Tool Co. of Cincinnati.

The Warder, Bushnell & Glessner shops, located at Springfield, O., have been closed and will reopen on Sept. 12.

SHOP BETTERMENT IN CLEVELAND.

The Cleveland Chamber of Commerce is unique, we believe, in having in connection with its industrial committee a paid secretary who devotes his time to shop betterment work. This includes all the methods by which shop conditions may be made to contribute to the greater efficiency, comfort and contentment of employes, and necessarily to more economical production. W. H. Moulton, secretary of the industrial committee, has made a close study on practical lines of the problem of shop improvement, and his work in Cleveland has been one of the most fruitful fields in which the Cleveland Chamber of Commerce has ever exerted itself. In view of the Dayton Cash Register Co's. experience or recent months and the efforts in some directions to widen the breach between employer and employe, the committee, of which Mr. Moulton is secretary, recenty sent out a letter to the members of the Cleveland Chamber, referring to the status of the work at the conclusion of the first year's operations. We quote the following from it:

"Your Industrial committee having recently completed the first year of its effort, wishes to reaffirm its faith in the principles for which it is working and to advocate their consideration by all employers. We believe it cannot be controverted that a satisfied, interested and efficient workman is better to deal with than one lacking these qualities, and that efforts tending to such results should, as a rule, commend themselves as good business, saying nothing of their social value, to the community.

"No one should believe that such efforts solve all labor problems. On such vital questions as wages, hours of labor, unions, etc., little more can be done perhaps than to establish a common ground of good will.

"Most of the changes that we have advocated have been things of small expense and effort, much as they might mean to all concerned. The larger work must grow out of the small, as its fitness commends itself. In a larger sense than we had thought, this industrial work in Cleveland during the past year has been of importance. Employers everywhere have inquired as to our methods and success. It has been recognized generally as a movement of profound significance.

"As an aid to this effort the committee would be pleased to avail itself of an invitation, if it has not already had one, of visiting any establishment with which you are connected, receiving your suggestions and rendering such help, if desired, as experience may suggest."

PRESENT DAY METALLURGICAL FUELS.

BY PERCY LONGMUIR.

To the iron manufacturer, the founder or the metallurgist the matter of fuel is one of extreme interest. In these days of high blast pressure in the furnace it is of vital moment that the most suitable materials be used. The evil effects of impurities, as sulphur and phosphorus, are well recognized. A coke with a high percentage of ash is not regarded with any tolerance, and fuels that do not yield the necessary amount of heat, or that crumble to powder with the weight of a descending charge are of comparatively little use in metallurgical operations. Fuels of greater purity are therefore desirable in order that they shall not contaminate the metals with which they come in contact. More efficiency or greater heat giving capacity is required in order to decrease the quantity of fuel used.

The distinct difference between the theoretical quantity of coke calculated to be necessary to melt a certain amount of iron in the cupola and that actually required is painfully familiar to every founder. It is, therefore, with this idea of increasing efficiency that many experimenters are at present working on the problem of the metallurgical adoption of liquid fuels, while the future extensive application of producer gas is acknowledged on all hands.

In what is written below those fuels of industrial interest will be dealt with briefly but at sufficient length to indicate their extent and variety. For convenience two divisions, natural and artificial, with various subdivisions, will be taken, as shown below:

NATURAL.		
Solid.	Liquid.	Gaseous.
1. Wood.	Petroleum.	Natural Gas.
2. Peat.		
3. Lignite.		
4. Coal { Non-coking rich in oxygen. Coking. Non-coking rich in carbon.		
5. Anthracite		

ARTIFICIAL.		
Solid.	Liquid.	Gaseous.
1. Charcoal.	Oils obtained from	1. Water Gas.
2. Coke.	the distillation	2. Wilson Gas.
3. Prepared briquette.	of certain minerals.	3. Siemens Gas.
		4. Mond Gas.

The intermediate varieties between wood and anthracite, which is the oldest coal geologically, represent the transition stages in the formation of that mineral.

Natural Fuels.

Wood is of comparatively little importance from a metallurgical point further than as a source of charcoal. When dry it consists of 96 per cent of woody tissue and 4 per cent sap. Small amounts of inorganic matter are also present and recently-felled samples contain more or less water. The composition of well dried wood is approximately as follows:

Carbon, 50. Hydrogen, 6. Oxygen, 42. Nitrogen, 2. or roughly, 50 per cent carbon and 50 per cent chemically combined water. Air dried wood consists of 40 per cent chemically combined water, 20 per cent hygroscopic water and 40 per cent carbon. The ash giving constituents vary from 1.5 to 2.5 per cent and yield an ash consisting of 70 per cent calcium carbonate, 20 per cent alkaline carbonate, and varying amounts of alkaline chlorides and sulphates, phosphoric acid, silica, magnesia, ferric oxide, and alumina.

The density of wood varies greatly. Air dried samples containing 20 per cent moisture and with a specific gravity higher than .55 are termed "hard," with a lower specific gravity they are known as "soft" varieties. Wood from which the air has been completely expelled will give a density between 1.4 and 1.5. The calorific intensity is naturally low—but the combustibility and amount of flame are great. The large amount of hygroscopic water contained renders wood unfit for the production of high temperatures.

Peat or turf is the result of the slow decay of plants under conditions in which the air supply is limited. Deposits of this fuel are found in many parts of the world. In Ireland 1-7 of the total area consists of peat bogs and in Great Britain peat beds cover an area of 6,000,000 acres with an average depth of 12 feet. Extensive deposits are found in Russia where peat is to some extent used as a fuel in metallurgical operations. The average composition of an air dried peat is given below:

Hygroscopic water.	Water.	Hydrogen.	Carbon.
25 per cent	28 per cent	2 per cent	45 per cent

The ash varies from 1 to 30 per cent and is rarely below 10 per cent. In the matter of ash and water, together with the great bulk, are to be found the chief objections to the use of peat as a fuel. To obtain the same evaporative power as coal, from 6 to 20 times the bulk is required.

Lignite. Brown coal and lignite represent intermediate steps between peat and true coal. The transition from woody tissue is very gradual and is well shown in the tabular form by Dr. Percy in which he represents carbon as a fixed quantity.

	Carbon	Hydrogen.	Oxygen.
Wood	100	12.18	83.07
Peat	100	9.85	55.67
Lignite	100	8.37	42.42
Bituminous Coal	100	6.12	21.23
Anthracite	100	2.84	1.74

Lignite is therefore of a more recent formation than coals of the carboniferous period, but older than peat. Recently mined samples contain up to 30 per cent moisture but on air drying part with half of this amount. The ash varies from 4 to 30 per cent. Lignites burn with a long smoky flame and the calorific powers and compositions of four varieties are shown:

	Calorific Power.	Carbon.	Hydrogen.	Oxygen.
1. Fibrous	5,000	57-69	5-6	28-37
2. Earthy	5,700	45-70	5-6	25-30
3. Conchordal	6,500	65-75	4-6	21-29
4. Bituminous	7,000	70-80	6-8	12-24

Coals. When subjected to dry distillation coal yields a larger amount of carbonaceous residue and the condensed products contain less water than is the case with fuels of more recent formation. They are distinguished from lignite by the greater density, and by the deep black streak given on scratching with a knife. The density of a coal is in direct proportion to the amount of carbon contained and in samples low in ash varies from 1 to 1½. A cubic yard of coal weighs 2,016 lbs. The amount of coke left after dry distillation varies between 45 and 95 per cent and the composition may be anything within the following limits:

Carbon	Hydrogen.	Oxygen and Nitrogen.
75 to 95	3 to 6	2 to 20

There are many classifications in vogue for distinguishing the varieties of coal and based generally on one of the following: Chemical composition, coking properties and physical or geological properties. Gruner's classification gives the following varieties:

1. Non-coking coals with long flames. Composition varies within the following limits:

Carbon.	Hydrogen.	Ox. and Nit.	Cal. Power.	Evap. fac.
75-80	4-6	15-19	8000-8500	8-10

On distillation they yield from 55 to 60 per cent of pulverent coke, the evolution of gaseous matter giving rise to long smoky flames.

2. Coking, long-flame, gas coal. Compositions vary between:

Carbon.	Hydrogen.	Ox. and Nit.	Cal. Power.	Evap. fac.
80-85	5-6	10-14	8500-8800	8-10

They yield from 60 to 68 per cent of coked but very friable and porous coke and from 32 to 40 per cent of volatile matter.

3. Bituminous or furnace coal. Coals of this type are black, not very hard, they burn with a smoky flame and soften or

intumesce in the fire. The yield varies from 66 to 75 per cent of swollen coke and 15 to 16 per cent gas. They contain:

Carbon.	Hydrogen.	Ox. and Nit.	Cal. Power.	Evap. fac.
84-89	5-6	5-10	8800-9300	9-11

4. Coking coals with short flames. Varieties of these coals contain:

Carbon.	Hydrogen.	Ox. and Nit.	Cal. Power.	Evap. fac.
88-91	4-6	5-7	9300-9600	11-12

They yield from 74 to 82 per cent of caked and very compact coke and from 12-15 per cent gas.

5. Anthracite coals. These coals form the transition to true anthracite. They burn with a short flame and yield from 82 to 92 per cent of frittered or pulverent coke and 8 to 12 per cent of gases. Coals of this type occur in South Wales and Pennsylvania. The ash may range from 1 to 20 per cent, but seldom exceeds 6 or 7 per cent. Composition, etc., as follows:

Carbon.	Hydrogen.	Ox. and Nit.	Cal. Power.	Evap. fac.
90-93	4	3-5	9200-9500	10-12

6. Anthracite. The analysis is as follows:

Carbon.	Hydrogen.	Oxygen and Nitrogen.
93-95	2	3

Anthracite is the final product of the many stages in the conversion of vegetable matter into coal. Its color is jet black with a vitreous lustre, structure homogeneous, and fracture conchoidal. It burns almost without flame and the carbonaceous residue shows no sign of coking. British anthracites decrepitate at high temperatures and therefore cannot be used in blast furnace practice to the same extent as Pennsylvania hard coal.

Liquid Fuels. Under the general term petroleum is included a series of natural hydro-carbons. In nature these are found impregnating clays, schists, marls and sands. Owing to the high percentage of ash such a material cannot be used direct as a fuel but is submitted to a preliminary distillation which yields tar products, mineral oils so called and gases. A bituminous schist of the Scotch coal measures known as bog-head mineral yields:

Combustible gases.	Fixed Carbon.	Ash.
70	10	20

When these hydro-carbons occur in sufficient quantity naptha and petroleum springs, or deposits of solid asphalt are formed. At Baku on the Caspian Sea and in Pennsylvania mineral oils are obtained in great quantities. Crude petroleum when distilled yields a product containing: Carbon, 79 to 88; hydrogen, 11 to 20.

The boiling point varies from 110 degrees to 280 degrees C. Many ingenious devices have been introduced for burning the oil in industrial operations. These include various forms of troughs, sprays and the conversion of the oil into gas before combustion.

Natural Gas may be extensively used in metallurgical operations and its freedom from sulphur is important as facilitating this use. It has a calorific power of 14,000 to 15,600 calories and a calorific intensity of 2745 to 2765 degrees. Its density compared with air is about .5 and in volumetric composition it varies as shown.

CH_4	H	N	C_2H_6	C_2H_4	CO_2	CO.
60-80.	5-20	1-12	1-8	0-2	0.3-2	Trace.

Prepared Fuels.

Dried. The advantages to be derived from the expulsion of water from any fuel containing it is apparent and need hardly be dwelt on here.

Compressed Fuels. Many attempts have been made to obtain a good fuel by mixing a binding material with small coal and pressing it into block or briquette. Coal tar, pitch and molasses have met with success as binding agents.

Carbonized fuels result from the heating of wood or coal without access of air. The constituents are re-arranged in the form of solid, liquid and gaseous compounds. Charcoal and coke are representatives of this class and are of great metallurgical importance.

Charcoal. Formerly extensively used as a blast furnace fuel, charcoal, owing to its high cost, has been replaced by coke or coal. The excellent qualities of iron produced in charcoal and cold blast furnaces are nof largely matters of memory to the founder, and it is a matter of regret that except for very high qualities of castings charcoal irons are debarred by the competition of today. Charcoal is the carbonized residue left after the dry distillation of wood. At a temperature of 350 degrees C. wood is resolved into a fixed residue, charcoal, and volatile products. The density of this residue varies from .2 to .5 according to the nature of the original wood and the temperature of carbonization. Charcoal is extremely porous and will absorb water and gases, and in this manner increase in weight while the volume remains constant. Average dry charcoal contains: Carbon, 90 per cent; hydrogen, 3 per cent; oxygen and nitrogen, 7 per cent.

Coke is the carbonaceous residue left after the dry distillation of coal. Good blast furnace coke is hard and compact. It should be clean to the hands, sonorous, and should possess a dark silver grey luster. It should be free from moisture and volatile hydro-carbons. To meet these requirements only those coals which on distilling yield a dry coherent residue can be used. A high percentage of ash or sulphur is detrimental and if the coal contains an undue proportion of these elements they must be removed by preliminary washing, and after the coking is completed, quenching the hot coke. Coke at ordinary temperatures will absorb from 1 to 2½ per cent of moisture, but when in actual contact with water it will absorb from 20 per cent to 50 per cent. The calorific power of a sample free from ash is 8000 calories, nearly equal to that of pure carbon.

Gaseous Fuels. Gas firing is not yet of universal adoption, but there is every indication that it is in this direction that future developments will occur. The economy, cleanliness and ease of manipulation of all gaseous fuels are most potent factors and when coupled with the fact that inferior fuels and waste products may be used to attain high temperatures, the real value of such a method of heating is apparent. At a central generating station fuel is converted into a combustible gas which is consumed by admixture of air at any desired part of the works. These gases are produced by burning the fuel in a long cylindrical column, termed a producer—whereby most of the carbon is burnt to carbonic oxide while the hydrogen remains free or is converted into carburetted hydrogen. Varieties of these gases are all known under the general name of "producer gases." Of these the most important are those of Siemens, Wilson and Mond, and water gas.

In a sketch of such brevity as the one here presented only representative types of metallurgical fuels can be shown and these in a general manner only. But the ground has been sufficiently covered to indicate the present field and it is to the future that the metallurgist must turn. Already gleaming in that future are vistas of the application of the electric current to heat problems, while gaseous and liquid fuels will find extensive fields to occupy.

Sheffield, Eng.

Lake Superior Iron Mines.

Joseph Sellwood, of Duluth, refers to the discrepancy between the statistics of iron ore production in 1900 as gathered by John Birkinbine, of Philadelphia, for the Division of Mineral Resources, U. S. Geological Survey, and the figures showing shipments collected each year by *The Iron Trade Review*. The production in Michigan in 1900, as the official figures show, was 9,926,727 tons; in Minnesota, 9,834,399 tons. The shipments in the same year were 9,456,355 tons for Minnesota, and 9,072,099 tons from Michigan. Minnesota thus leads by nearly 400,000 tons in shipments, but is nearly 100,000 tons behind in production. With 60 per cent of its properties mined on the open-cut plan, a large percentage of production in Minnesota stops short with the close of the navigation season, whereas the Michigan mines continue through the year. The argument is made that the amount of ore sent to market each year is the proper gauge of the position of a State in the iron ore industry, and on this basis Mr. Sellwood claims pre-eminence for Minnesota.

The offer of Warren, Pa., to the Marinette Iron Works Mfg. Co., of Marinette, Wis., has been declined. The company will remain at Marinette and will install a gas plant and put in more tools and machinery. In addition to the Wallrath gas engines it will manufacture the Kimpling rock crusher.

Gilbert & Lugger have purchased the Baker City Iron Works, and Gilbert & Benbow have purchased the Blue Mountain Iron Works, both plants located at Baker City, Ore.

SUGGESTED AT THE SHOP.

BY F. O. REMAN.

There is a big difference in the way in which the different shops are led along the path of efficiency by means of rules and regulations. Judging by the manner in which they are arranged and displayed one is in doubt whether the rules were in many cases intended to be read or whether they were considered as fulfilling their mission when they were tacked up on the wall in some more or less conspicuous position. Some employers get out lengthy statements covering about everything in sight: the time to start in or quit, responsibility for tools and other supplies, care of machinery, conditions under which conversation or visitors may or may not be allowed, and a good many more of the same class. Others refrain from any more than they can possibly avoid and content themselves with the baldest injunctions.

* * * * *

As I understand the matter, it is entirely optional with the employer to do as he thinks best for the interests of his shop and he has a right to consider that his men will handle tools with reasonable skill and care. That they have sufficient acquaintance around machinery and shops not to trifle with either, is surely a part of their training upon which he may count with some degree of certainty. He may be deceived, of course, but the sheet of rules would not help him a lot even in that case. If men are forbidden by rules to run elevators or to put on main belts while shafts are in motion, etc., and the regulation is accompanied by a threat that the culprit will be dismissed instanter, then the rules have enough vigor and reason to justify their use and they may be of some value to the employer, provided he enforces them.

* * * * *

It is the enforcement that really counts and not the threat. I remember a case where damages were obtained by a boy who was injured while putting on a belt, although the printed rules and regulations of the shop distinctly condemned the practice and laid down a penalty. It turned out at the trial that the rule was frequently broken and that the men in charge were well aware that it was a dead letter; therefore the judge held that the firm was liable and they had to settle.

* * * * *

I have lately seen a photograph of a machine shop that shows something that an ordinary rule would not cover, I am afraid. In the foreground of the picture is a lathe and across the ways rests a 14-inch file. The putting of a file on the ways of a lathe is in the same class with throwing a lot of files together in a drawer, scoring an arbor or drilling into the table of a drill press. It shows a lack of care not easily rectified by rule or regulation and the individual can only be classed with those of whom it may justly be said, "Let no such man be trusted."

* * * * *

One machine shop of my acquaintance has a rule that is rather a rarity, but the more I think it over the more I like the idea. There is an impulse among machinists to go out and consult the scrap pile whenever a new demand for almost anything comes along. In fact, I have known men to boast of the things they have picked out of the heap and worked up into tools or appliances of all sorts. Now it is all right if there is no other source of supply, or it may be justified on the assumption that the fellow who does the hunting has time to throw away, but on no other condition is it worth while to poke through the pile. The firm I refer to does not allow any turning over of the scrap pile but requires the men to go to the stock room for so many inches or feet, as the case may be, of whatever material is desired and it is handed out and cut exactly to length.

* * * * *

Speaking of the fellows who boast of the things they have built out of the scrap heap, I recall the case of a superintendent who points to a nice engine in the plant under his charge as having been made out of the time-honored pile that took up a good-sized corner of the yard. But when you pin him down to details it comes out that he went through the shop and took out the infirm and crippled tools that were no longer useful, threw them into the scrap, then sold the lot and bought the engine.

OUTPUT OF BLAST FURNACES OF UNITED STATES.*

August 1, 1901.

Location of Furnaces.	Coke and Anthracite.					Charcoal.				
		In Blast.		Out of Blast.			In Blast.		Out of Blast.	
	Total No. of Stacks.	Number.	Weekly capacity.	Number.	Weekly capacity.	Total No. of Stacks.	Number.	Weekly capacity	Number.	Weekly capacity.
New York	14	4	5038	10	4357	3	1	612	2	270
New Jersey	8	3	1868	5	2659	.....	.....	.....	.....	.....
Spiegel	3	3	753	0	0	.....	.....	.....	.....	.....
Pennsylvania:						13	1	50	12	534
Lehigh Valley	26	11	7458	15	5231	.....	.....	.....	.....	.....
Spiegel	1	1	110	0	0	.....	.....	.....	.....	.....
Schuylkill Val	13	9	6670	4	1840	.....	.....	.....	.....	.....
Upper Susqu. Val	2	1	1032	1	336	.....	.....	.....	.....	.....
Lower Susqu. Val	0	7	589	3	931	.....	.....	.....	.....	.....
Spiegel	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Lebanon Valley	12	12	8626	0	0	.....	.....	.....	.....	.....
Pittsburgh Dis't	32	31	70134	1	1345	.....	.....	.....	.....	.....
Spiegel	1	1	1819	0	0	.....	.....	.....	.....	.....
Shenango Valley	15	14	19896	1	1003	.....	.....	.....	.....	.....
West'n Pennsylvania	19	12	16736	7	3088	.....	.....	.....	.....	.....
Spiegel	1	1	458	0	0	.....	.....	.....	.....	.....
Maryland	5	4	5602	1	1200	4	0	0	4	443
Wheeling District	9	8	10718	1	2140	.....	.....	.....	.....	.....
Ohio:						9	3	142	6	439
Mahoning Valley	15	13	26343	2	2810	.....	.....	.....	.....	.....
Central & Northern	14	14	25134	0	0	.....	.....	.....	.....	.....
Hocking Valley	2	2	700	0	0	.....	.....	.....	.....	.....
Hanging Rock	13	9	5380	4	907	.....	.....	.....	.....	.....
Illinois	16	16	32272	0	0	.....	.....	.....	.....	.....
Spiegel	1	1	1071	0	0	.....	.....	.....	.....	.....
Minnesota	1	0	0	1	763	.....	.....	.....	.....	.....
Wisconsin	5	3	3522	2	1176	.....	.....	.....	.....	.....
Missouri	1	0	0	1	570	.....	.....	.....	.....	.....
Colorado	2	2	3000	0	0	.....	.....	.....	.....	.....
Virginia	21	15	7819	6	3033	3	1	40	2	140
Kentucky	5	3	1544	2	935	3	0	0	3	200
Alabama	34	26	21774	8	5200	4	4	1371	0	0
Mich., Mo. and Wis.	.....	.....	.....	.....	.....	11	6	3442	5	1499
Tennessee	15	9	5897	6	2697	5	1	343	4	360
Georgia	1	0	0	1	450	4	1	260	3	783
North Carolina	1	0	0	1	437	.....	.....	.....	.....	.....
New England	.....	.....	.....	.....	.....	7	3	278	4	360
Texas	.....	.....	.....	.....	.....	4	1	140	3	731
Utah	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Oregon	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Totals	318	235	297269	83	43111	70	22	6578	48	5830

SUMMARY.

Fuel.	In Blast.						Out of Blast.			
	Number.			Weekly Capacity.			Number.		Weekly Capacity.	
		Month Previous.	Year Previous.		Month Previous.	Year Previous.		Month Previous.		Month Previous.
Charcoal	22	22	31	6,578	7,157	8,295	48	47	5,830	5,022
Coke and Anthracite	235	227	209	297,269	303,793	236,131	83	84	43,111	47,876
Total	257	219	240	303,847	310,950	244,426	131	131	48,941	52,898

*Condensed from the *Iron Age*. The decrease of unsold stocks, so far as these are reported (none of the stocks of the steel companies being included), was from 392 598 tons July 1, to 387,329 tons Aug. 1, or about 5,000 tons.

Large Increase in Car Orders Over 1900.

The increase in cars and locomotives ordered each month this year over the orders placed in the corresponding month last year continued in June and July. The summary of the orders noted by the *Railroad Gazette* shows 4,024 cars and 43 locomotives ordered in June, 1900, against 10,118 cars and 297 locomotives in June, 1901. For July, 1900, the figures are 6,070 cars and 40 locomotives against 8,339 cars and 85 locomotives ordered in July, 1901. The totals for the first seven months indicate that about 70 per cent more locomotives have been ordered so far this year than were ordered in the same period of 1900, and about 80 per cent more cars. The June car orders are divided as follows: Box, stock and refrigerator cars, 4,990; coal and ore cars, 4,576; flat cars, 230, and passenger cars, 322. The division of the July car orders is: Box, stock and refrigerator cars, 5,730; coal and ore cars, 1,917; flat cars, 340; tank cars, 100, and passenger cars, 252.

The Pan-American Exposition--IV.

FURTHER EXPLORATION OF THE MACHINERY BUILDING.

(Staff Correspondence.)

BUFFALO, Aug. 19.—Prentice Bros. Co., of Worcester, Mass., has a fine display of electrically driven drills and lathes. There is a 14-inch lathe with a 6-ft. bed, and a 16-inch lathe with an 8-ft. bed; both motor driven. These lathes are driven by constant speed electric motors, attached under the bed, properly insulated and protected. Motion to the spindle is transmitted through gearing, and the requisite changes of speed

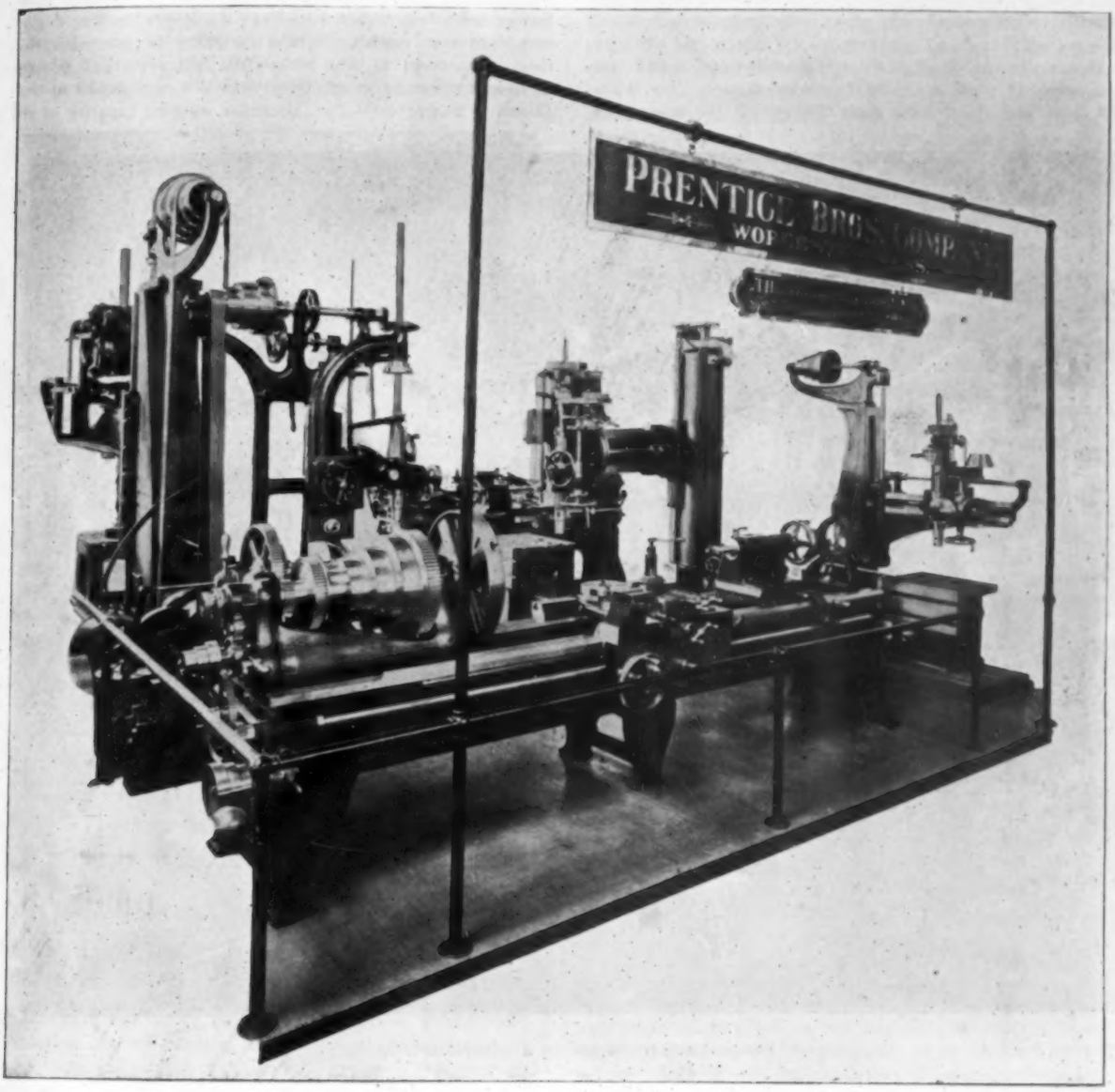


FIG. 1.—EXHIBIT OF PRENTICE BROS. CO.

are mechanical, by levers projecting from the head under the guard hood. The lathe is stopped or started or the motion reversed, and at an accelerated speed, entirely independent of the motor, by a lever attached to the apron convenient at all times to the operator. The company can supply other types of motors attached in any manner desired, but from a thorough trial prefers a constant speed motor and an ordinary starting box as entailing less loss of electrical energy than if the speed were reduced by armature resistance or increased by field resistance. The method of reversing the lathes mechanically changes the spindle motion instantly and allows screws to be cut to a shoulder.

There are eight changes of spindle speed, from 4 to 284; a feed belt tightener and choice of gear or belt feed. Hard bronze bearings are provided and the end thrust of spindle is sustained by a step, independent of the bearing. The footstock is offset so that the compound rest can be swung around conveniently on short stock.

The firm also exhibits a plain 24-inch double back geared lathe with a 12-ft. bed, and the following drills: A 28-inch standard motor-driven with reverse motion; a No. 6, universal type, 6 ft. arm, radial; a No. 10 motor driven radial. The 28-inch swing drilling machines, standard pattern are driven by constant speed motors connected to the cone shaft by two trains of gears running in opposite directions. On the shaft are two friction clutches, controlled by a lever, by which the machine is instantly stopped, started or reversed on the same plan as the lathe already described. The gears are heavy, serving as a balance wheel to the motor and thus preventing overload. There are eight changes of spindle speed, by cone belt and back gears. These machines have vertically adjustable heads, the heads and spindles counterbalanced, hand and power feeds, improved quick return and stop motion, permitting the spindle to be quick-returned or approached while power-feeding and the point of the drill to be brought to the work and the power feed to be thrown by the same lever while the machine is in operation. Back gears are controlled by a lever within easy reach of the operator. Holes in the spindles are Morse taper. The No. 10 and No. 6 radial have much in common and the motor attachments to the No. 10 have similar characteristics in handling as the arrangement of the 28-inch drill, but a larger electric motor, a 3-h. p., is needed. The radial is gear driven from the top shaft. Back

gears are on the head to relieve shafts and gears of strain. The arm is on ball bearings and has a vertical adjustment by power. The movement of the head along the arm is controlled by a hand wheel, rack and spiral pinion and cannot vary its position by accidents. The spindle is back geared and has the same improved quick return and stop motion as on 28-inch drill. The base plate is slotted and either universal table, or the box table shown in the illustration, is at the disposal of the purchaser.

Exhibit of the Brown & Sharpe Mfg. Co.

The Brown & Sharpe Mfg. Co., Providence, R. I., has an extensive collection of small and large tools. The case of small tools does not show up in the illustration, but the opportunity to get a good view of so large an exhibit is necessarily a limited one and a picture of the case would not give the contents in any detail so the attempt has been made to get in as much as possible of the larger machinery. The overhead work and the belting gives the exhibit the appearance of a typical machine shop, particularly as all the tools have work of some kind or another on the table or between the centers, and the machines are all belted up for business. A large bench measuring machine and a lot of the small tools made by the Brown & Sharpe Mfg. Co., are shown in cases and the list of machine tools is as follows:

A No. 2 universal milling machine with a table having an automatic longitudinal feed of 23 inches, an automatic transverse movement of 6½ inches, and a vertical movement of 17½ inches measured from center of spindle. A No. 4 universal milling machine with feeds of 33½ x 8½ x 19 inches, the centers swing 14 inches in diameter and take 32 inches in length. A No. 5 plain milling machine with automatic feeds of 48 x 9¾ x 19½. The table feed is chain driven and 12 changes of feed from .008 to .314 inch to one revolution of the spindle are permissible by means of change gears. A No. 12 plain milling machine with feeds of 26 x 5-8 x 7½ inches with similar drive to a No. 5 but a range of .012 to .059 of an inch to each revolution of the spindle. A No. 2 universal grinding machine taking 30 inches between centers and having 12 inches swing. A No. 11 plain grinding machine capable of grinding work, either straight or taper to 1¾ inches to the foot, from ⅛ to 4 inches in diameter and from 1 inch to 30 inches in length. A No. 2 surface grinding machine with a capacity for work 18 inches long, 6 inches wide and 9½ high. A No. 3 universal cutter and reamer grinder taking 18 inches between centers and cutters and shell reamers not exceeding 6 inches in diameter and 7 inches long. A No. 3 automatic gear cutting machine to cut gears 26 inches diameter, 8 inches face and 5 diametral pitch. A No. 6 automatic gear cutter with a spur gear capacity of 60 x 12 inches and 2 diametral pitch. A No. 00 and a No. 1 automatic screw machine. The former has a hole 5-16 inch through the largest feeding finger and turns any length to 1 inch; the latter has a capacity in these respects of ⅝ x 2 inches. A No. 2 vertical spindle milling machine is on exhibition which is not shown in the Brown & Sharpe catalogue. It has a working capacity of 26 x 12 x 20 inches. The spindle has a No. 10 taper hole and the arbors and cutters can be held by a bolt passing down through the spindle. The spindle pulleys are carried on a separate sleeve, thus preventing any strain on the spindle due to the pull of the belt. A stop with micrometer adjustment is provided on the left side of the head for controlling the depth of the cut. The elevating screw does not run below the base of the machine and the thrust is taken by ball bearings. A lever on the right of the knee serves to reverse all feeds; there are twelve changes in each direction, evenly graded from .005 to .125 inch per each revolution of the spindle. The change feed device is located inside of the upright and the changes are obtained by unlatching and sliding a lever that sets the different combinations of feed gears. An index shows plainly the desired feed.

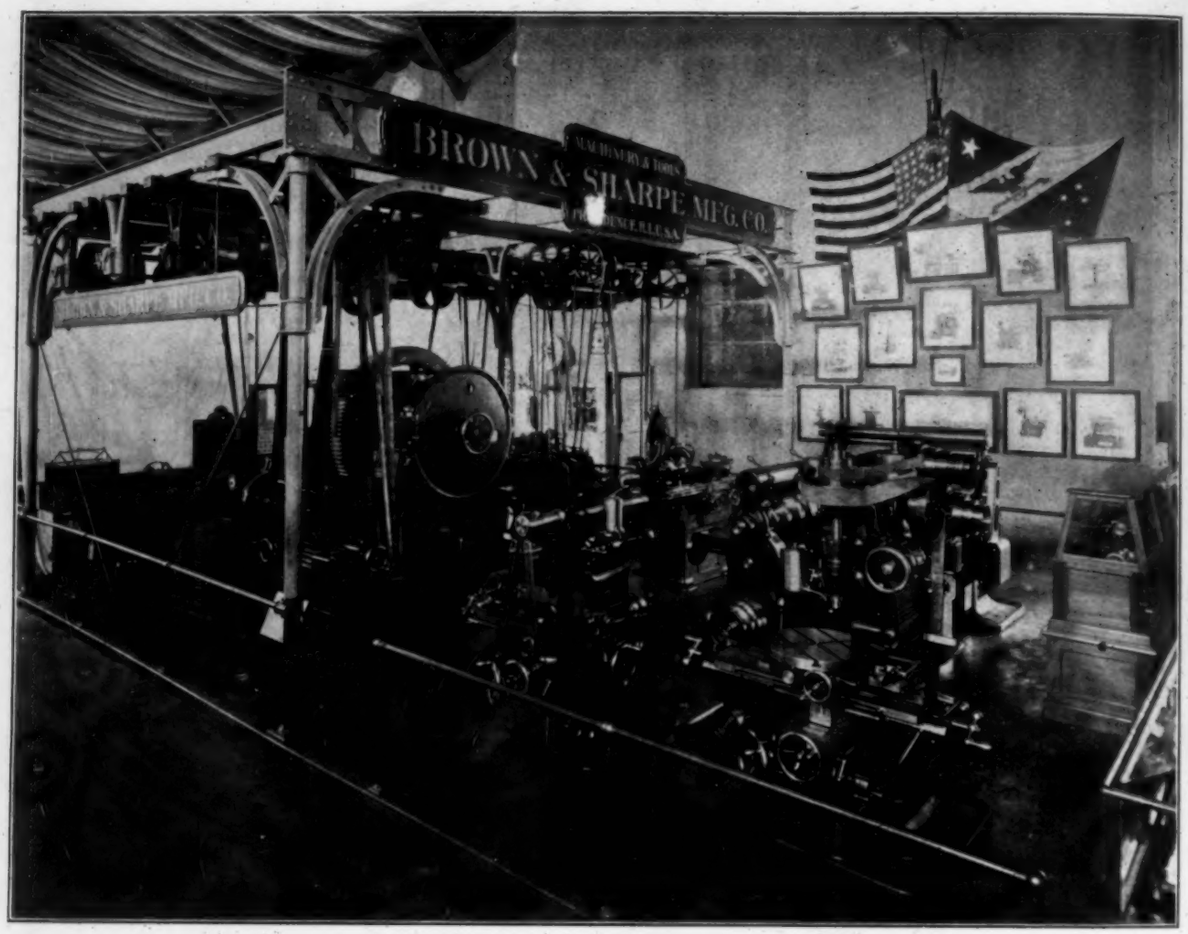


FIG. 2.—EXHIBIT OF BROWN & SHARPE MFG. CO.

Twist Drill Exhibits.

The twist drill manufacturers have gone to considerable expense to put up fine collections of their products and my re-

gard for the twist drill is of sufficient caliber to doubt whether even the handsome cases which set forth its beauties are any too ornate to do it justice. The natural tendency of the throng to go where it can see the wheels go round is likely to stand in the way of such exhibits as those of abrasive compounds as well as of the familiar twist drill, and they may fail to get that attention from the populace that they really deserve. When one sums up the advances they have made possible in interchangeable work in the use of jigs, etc., their title to a high place becomes clear; in short, in the whole province of making round holes, they have been penetrating pioneers. They come as near as anything in the line of machine shop equipment to representing high quality of workmanship at a minimum price and I rather regretted the more spectacular features elsewhere that might overshadow them. The gentlemen in charge of these exhibits did not share this fear and stated that they not only got a fair share of the attention of the general public but that mechanics were not victims of that familiarity which is said to breed contempt and inquiries were

FIG. 3.—EXHIBIT OF CLEVELAND TWIST DRILL CO.

frequent concerning twist drill manufacture and the more recent developments in these goods.

The Cleveland Twist Drill Co. of Cleveland has a comprehensive collection of twist drills of various kinds; solid, expansion and self-feeding reamers, snap gauges, mandrels, lathe mills and a line of mills for regular milling machine practice. The firm show a number of oil-tube drills and sockets; the drills having a brass tube let in a groove in the "land" between the ordinary flutes of the drill. These tubes communicate with holes in the drill shanks which in turn register with a channel in the body of the socket. The socket has a loose collar with a short nipple, and this is in turn screwed on to a piece of ¼ inch gas pipe leading to an oil supply over the drill press. The oil runs through channels in the collar and in the body of the socket into the orifices in the shank of the drill and so on through the tubes to the cutting lips of the drill. The drill can be run at a much higher speed without heating or sticking in the hole than if the oil were poured on the drill shank some inches away from the point, in the time honored way. I was informed that one of these 1 1-16 inch drills has been pushed through 55 feet of machinery steel in 12 hours without grinding the drill from start to finish.

The snap gauges are akin to the common C-clamp with hardened and ground tool steel screws; the screws and check nuts having milled heads. These can be set to a standard plug and then locked with the jamb nut when they are ready for use. For tool-room purposes they are a sensible substitute for a micrometer-in many instances where several tools must be checked out in the shop to agree with a single size. The handsome case in which the products of the Cleveland Twist Drill Co. are displayed deserves mention. It is elaborately carved, presumably of cherry, with heavy plate glass shelves supported by large drills with their cutting lips set into countersunk plates. The general arrangement will be noted from the illustration.

The Standard Tool Co., Cleveland, occupies a space about 15 x 20 feet, with an electrically welded steel tube arch leading thereto, surmounted by a shield, the trade mark of the company. In the center is a case 12 ft. long by 4 ft. wide, of plate glass, with three shelves, on a massive quartered oak base. In the middle of the case at the base is displayed a hollow drill, 5 ft. long, and about it are grouped a 4-inch taper shank drill, a 6-inch adjustable shell reamer, and a 3-inch cannon drill, with flexible steel tube for oil feed, attached. All these are tools of unusual dimensions, and adapted to very heavy work. Around them are grouped the common run of drills, with straight and twisted flutes; two, three or four grooves; straight, taper and threaded shanks, etc., in great variety. There is a gang of milling cutters about 3 feet long on an arbor as representing one extreme, and on an upper shelf the other limit is found in a set of wire drills ranging from 228-1000 of an inch to the diminutive 5-1000 inch diameter. The ordinary drill gauge goes to No. 60, but this has been passed long ago; and the writer has some experience, in common with many other machinists, with the No. 80 and the delicate treatment that steel splinter demanded. Now a No. 80 is 13-1000 inch, from which a comparison may be made with the piece of work little more than one-third that size. A magnifying glass hangs in front of it and one covets a closer glimpse of the drill than is afforded even by that means. A number of oil-tube drills with flexible steel tubing attached; a lot of milling cutters with regular and irregular outlines; straddle mills for nuts, bolt heads and the like; three groove chucking reamers and Standard drill chucks and grip sockets are shown.

The amount of glass in several of these displays has a fine effect at close range, but at a greater distance the reflected light interferes with a good photograph and in some instances it has been very difficult to do justice to the exhibit with a camera. This is the case with the Standard Tool Co., whose exhibit is finely arranged and equally well selected, but a distinctive photograph was not to be obtained.

The stockholders of the National Enameling & Stamping Co. have voted to issue bonds to the amount of $2,500,000 of 5 per cent. bonds, which the St. Louis Trust Co. has agreed to buy. On July 1, 1901, the total mortgage and floating debt of the company, amounted approximately to $2,650,000, of which $525,000 is represented by mortgages which were upon two of the smaller plants of the company at the time they were acquired, and the balance of $2,125,000 represents bills payable. The proceeds from the sale of bonds, together with balance on hand, will satisfy all the obligations of the company and leave a surplus. The company has liquid assets consisting of cash, merchandise, bills and accounts receivable to the amount of upward of $5,200,000. Under the terms of the mortgage 10 per cent. of the entire issue of bonds is to be paid off annually at par. The cost of the steel plant and rolling mills at Granite City and St. Louis, now completed, and the extensions and improvements in the other plants of the company, for which no stock has been issued, amounts to $2,500,000.

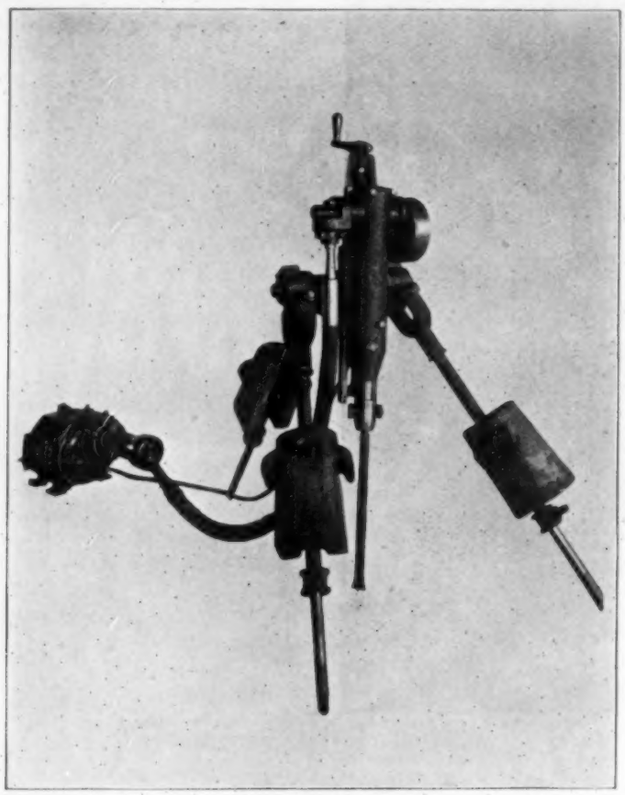
The members of the blast furnace workers' unions in the Mahoning and Shenango Valleys have decided that they cannot take part in the Labor Day demonstrations, as it will be impossible to bank the furnaces on account of the resultant loss to the proprietors. Some time ago the members of the association started a movement in favor of stopping work on Labor Day and banking the furnaces.

GARDNER ELECTRIC ROCK DRILL.

An electric rock drill, or more particularly speaking, a mechanical drill operated by an electric motor, has been receiving attention in Western mining districts. It is placed on the market by the Gardner Electric Drill & Machinery Co. of Denver, Col., and its operations cover a period of about two years. It was designed with a view to securing the same amount of cutting efficiency in the drill hole that is secured by steam or air with a smaller initial power than is required in the case of the latter. The air drill has passed through various stages of improvement, all with a view to simplifying it, and it is believed there is now transmitted to the cutting bit practically all the power the steel will stand. Without a decided improvement in the drill steel now manufactured, no great increase in cutting capacity is to be expected, the modern pneumatic drill representing high attainment in simplicity and durability.

The invention of the electric rock drill was the result of the effort to economize power, in view of the large steam equipment required to operate air drills, in proportion to the amount of work delivered to the drill hole.

The Gardner electric drill has been in operation in mines for about a year, with results quite satisfactory to the users. Frank Gardner, one of the largest of mine owners, gave it his name after the claims of the inventor had been fully tested by his experts. In connection with the accompanying cut we have the following description from the manufacturers, who claim that only a fraction of the power required by an air drill of equal weight, is necessary, and that the cost of installation is relatively low.



GARDNER ELECTRIC ROCK DRILL.

The power of the drill is conveyed to the drill through a flexible shaft, which allows the electric motor to be placed in any convenient position close to the drill. Beside the regular safety fuse, which is placed in the circuit to protect the motor from damage, experience has taught that the miners are very likely to be careless in replacing fuses and, in some instances, are inclined to insert a piece of copper wire, or a nail, in lieu of the fuse, and to overcome this is another safety device, called a slip friction gear.

In the ordinary equipment the motor runs at 1,800-r. p. m. and is geared by means of a phosphor bronze pinion and cast iron gear to the jack shaft. This cast iron gear is loose on the shaft, which it drives by means of two fiber discs on either side of the hub, the pressure being produced by a spring which is set at sufficient tension to drive the drill under normal conditions, but should the drill steel stick in the rock and prevent rotation of the flexible shaft, this cast iron gear will slip, thus preventing serious damage to any part of the mechanism.

The power is transmitted from the flexible shaft to a pair of miter gears, and thus rotates the crank shaft. This latter transmits power to what is termed a draw-bar and in which is a cam slot, giving the draw-bar and piston a relatively quick forward motion and a slow return. The draw-bar transmits power to the piston through spiral springs, which are of sufficient strength to strike the blow necessary to cut rock, at the same time being useful in forming a cushion if it is desirable to ream a hole, as the drill can be run without striking rock without damage to the machine. Owing to the peculiar shape of the cam slot, the forward stroke of the piston is imparted with one-quarter turn of the crank, the next half-turn of the crank being employed in withdrawing the drill, the last quarter turn imparting no movement to the draw-bar.

The balance wheel is geared directly to the crank shaft. The rotation of the drill is effected by means of ratchet wheels located in the forward part of the body of the drill and surrounding the piston. In the piston are straight grooves which engage the corresponding ratchet wheel for guiding the piston straight during the forward stroke, and spiral grooves which engage the corresponding ratchet wheel for rotating the drill on its backward stroke. The steel is held in the chuck by a novel one-nut clamp, it being only necessary to turn the nut one-quarter turn to remove the bit. The main clamp of the drill is held by one bolt and by loosening one nut the drill is in a perfect swivel. A feature of the clamp is its side motion, as by means of the side slip the drill body may be moved to one side a sufficient distance to permit of removing and replacing the long steels. After this operation it is brought back and placed against a stop without losing the alignment of the hole.

The Standard Roller Bearing Co. of Philadelphia, announces that it has purchased the entire axle business for wagons, carriages and automobiles of the Ball Bearing Co. of Boston, and is prepared to fill orders for the products of the latter.

BRITISH IRON TRADE IMPROVING.

A stronger tone characterizes the iron and steel trades of the country generally. In some districts the improvement is more pronounced than in others, but there can be no doubt that there is a decidedly better tendency all around, and that nearly all branches are sharing it. Although trade shows no sudden and marked expansion, there is little doubt that buyers are becoming confirmed in the belief that it is useless to wait for any further reductions in prices in view of the strong trend of the market in the opposite direction, and that the business put through is steadily growing in volume. In the pig iron department buyers have become much keener, and prices are advancing in some instances, while in others an upward movement seems imminent. In regard to finished material producers give encouraging accounts of the situation, and a fairly active business is reported. In the shipbuilding industry the inquiry for new boats continues good. The new work booked on the Clyde last month amounted to some 45,000 tons, and altogether builders in this center have ten times that amount of tonnage in hand. Abroad there is no marked change to notice, but the labor trouble developments in the United States will be watched with interest.

Pig Iron.—The improvement in this branch of trade is maintained, and in some quarters has become accentuated during the past week, and a more cheerful tone pervades the market generally, the hope being entertained that we are now entering upon a more or less prolonged period of active trade and rising prices. In the north of England the demand is strengthening noticeably, and makers' quotations are going up accordingly. Buyers are now paying something like 3s. more for Cleveland warrants than they had to give a month ago, while in the same period No. 3 has improved to the extent of 2s. 6d. per ton, and the lower qualities of iron have also moved up. In Lancashire the revival is not so marked, but prices are undoubtedly stiffening, while in South Staffordshire makers are chary of entering into important contracts for future delivery at present rates. The Glasgow market continues firm, and Scotch warrants are quoted at 53s. 11d. The following is a statement of the public stocks:

	Tons.
Connal's Glasgow	59,100
Connal's at Middlesbrough	111,200
Railway Stores, Middlesbrough	8,400
Connal's at Middlesbrough, hematite	3,280
Cumberland & Barrow Stores	21,200

Manufactured Iron and Steel.—A more active business is passing in finished material, and many makers have sufficient orders on their books to keep them employed for the next two or three months. The various advances which have been made of late, especially in shipbuilding material, far from checking the demand, seem to have strengthened it, consumers being anxious to place their orders before further rises take place. The manufacturers in the North of England are leading in the matter of advances, and are in a strong position as regards the amount of work on their books, despite the fact that in other districts prices are lower than theirs. There is a general upward tendency, however, in nearly all the chief centres, and finished material is becoming dearer everywhere. Some small upward movements are recorded this week. Plain iron castings have gone up 2s. 6d. in Middlesbrough, while in South Wales steel sheets are 2s. 6d., and rails 5s. dearer.

Foreign.—Our New York correspondent cables that the labor troubles continue. There can be no doubt that the effect of the strike, so long as it lasts, will be favorable to British steel manufacturers and tinplate makers. Already, indeed, it is influencing a larger demand for tinplate from the United Kingdom, and as the production of tin bars and rails has already been materially interfered with, it seems to be probable that a considerable increase of orders for both of these commodities may be expected on this side from the States. In regard to the Continent the position of French makers is not altogether encouraging, for the business given out is still far from providing regular employment at all the mills, and in the case of the bar firms it is becoming more and more difficult to keep the plants running. Consumers will not cover their forward requirements, and are contenting themselves with purchasing only just sufficient for their current needs, and under these circumstances the northern firms find it extremely difficult to keep up prices. In Belgium the evidences of depression are so pronounced that it is impossible to point to any encouraging feature. German trade is dull.

Comparison of Prices.—The annexed table shows the current prices compared with those of last week, and of the corresponding period last year:

	Aug. 8, 1901.	Aug. 1, 1901.	Aug. 9, 1900.
IRON ORE—	s. d.	s. d.	s. d.
Rubio, Middlesbrough	15 9	15 0	21 9
" Cardiff	14 6	14 6	20 6
Pottery Mine, North Staffordshire	20 6	20 6	20 6
Hematite, West Coast (at mines)	16 6	16 6	17 6
PIG-IRON—			
No. 3 foundry, Middlesbrough	46 0	46 0	69 9
Warrants,	45 10	45 10½	70 0
Scotch warrants, Glasgow	53 11	54 0	73 2
Hematite warrants, West Coast	60 4½	58 7	82 9
Cold blast (foundry), South Staffs.	115 0	115 0	130 0
Welsh hematite, Cardiff	56 6	56 6	84 0
MANUFACTURED IRON & STEEL—	£ s. d.	£ s. d.	£ s. d.
Marked bars, South Staffordshire	8 10 0	8 10 0	11 10 0
Common bars "	7 5 0	7 5 0	10 15 0
Steel rails, Middlesbrough	5 10 0	5 10 0	7 7 6
" West Coast	5 5 0	5 5 0	7 5 0
" Cardiff	5 10 0	5 7 6	7 0 0
Steel angles (eng.), Middlesbrough	5 17 6	5 17 6	8 10 0
" " Glasgow	5 12 0	5 12 0	8 2 6
Steel plates (ship), Middlesbrough	6 7 6	6 7 6	8 0 0
" " Glasgow	6 2 6	5 15 0	8 2 6
Tinplates, Bessemer I. C. cokes, South Wales	s. d.	s. d.	s. d.
	14 9	14 6	14 6

—[London Iron and Coal Trades Review, August 9.

The Nicholson File Co. of Providence, R. I., has purchased the entire business, including plant, patents and good will of the J. Barton Smith Co. of Philadelphia, Pa. By the purchase of this plant the Nicholson Co. secures practical control of the majority of the file and rasp manufacturing plants of the country.

Furnace No. 4 of the Roane Iron Co. at Rockwood, Tenn., was blown in last week. The furnace has just been completed and will have a daily capacity of 200 tons. Furnace No. 3 has gone out of blast for much needed repairs.

After an idleness of six months work was resumed at the Second and Chestnut streets foundries of the Reading Foundry Co., Reading, Pa., last week. Flange pipe and special castings are made at these plants.

The Harrisburg Foundry & Machine Co. of Harrisburg, Pa. has received the contract for three 300-h. p. engines for the Union Club of New York City. Other contracts recently closed call for one 100-h. p. engine for the Pennsylvania repair shops at Sunbury, Pa.; one 750-h. p. tandem compound engine for the Charleston Consolidated Gas and Electric Co. of Charleston, S. C.; one 400-h. p. engine for the Otis Elevator Co. of Yonkers, N. Y.

On August 17 the Ames Shovel and Tool Co., to manufacture all kinds of agricultural tools, was incorporated at Trenton, with a capital of $5,000,000, $3,000,000 preferred and $2,000,000 common stock. The incorporators are Lawrence Greer and Herbert B. Taylor of New York, and Oliver W. Mink of Boston. While the company proposes to manufacture all kinds of tools, it is really a merger of the shovel manufactories, the Ames Shovel Works practically forming the basis for the combine. Next to the Ames Shovel Works the most important works in the combine are the Rowland Shovel Works of Philadelphia, Pa.; Wright & Alford Shovel Works of Terre Haute, Ind.; St. Louis Shovel Works, St. Louis, Mo., and the H. M. Meyers Shovel Works, Beaver Falls, Pa.

The plant of the Lockhart Iron & Steel Co., McKees Rocks, Pa., is being operated with three turns. A number of strikers were given employment when the plant went on three turns.

The LaBelle Steel Co. of the Crucible Steel Co. of America, Allegheny, Pa., is erecting a new foundry with a capacity of about 15 tons daily.

THE UTILIZATION OF BLAST FURNACE GASES.

At a recent meeting of the German Association of Iron and Steel Makers, an important paper was presented by Herr Lürmann on recent developments in the utiilzation of blast furnace gases. From this and from the discussions, which are very fully reported in *Stahl und Eisen*, we obtain many interesting particulars as to the work done in this direction in Germany and elsewhere, and its extent and importance.

As regards the progress made during the last three years Germany, with Luxemburg and Belgium, heads the list. The following figures represent the power developed with engines at work or in hand in April, 1901. Germany now employs 58 per cent of the total power, 9,900-h. p. generated in Simplex engines supplied by the Cockerill Works at Seraing in Belgium, and affiliated firms: 10,120-h. p. in Deutz engines; 12,800-h. p. in Oechelhaüser two-cycle engines from the Deutsche Kraft Gesellschaft; 6,740-h. p. from the Nürnberger Maschinen Fabrik, and 5,105-h. p. from Körting engines, making the large total of 44,665-h. p. There are 7,600-h. p. in Belgium, 7,400-h. p. in France, and 1,800-h. p. in Italy now furnished by Simplex engines from the Seraing and associated firms. Luxemburg, one of the pioneers of this industry, has at Differdingen and Dudelingen 6,600-h. p. in Simplex engines from Seraing, and 3,200-h. p. from the Deutz-Otto firm, or a total of 9,800-h. p. In Russia there are two Seraing engines of 700-h. p. at Toula, as well as three Oechelhaüser engines, giving an aggregate of 1,500-h. p. at Kamenskoje, and a 30-h. p. Deutz engine; total, 2,230-h. p. In England and in Spain respectively only 600-h. p. are developed from Simplex engines, and these two countries stand last on the list. The total power in Europe is 77,545-h. p. In the United States nothing has been done in this direction, which is a surprise to German engineers, who have considered this country as always ready to lead in improvement.

As to the kind of engines used, three of the chief German firms supply gas engines for blast-furnace gases, the Gas Motoren Fabrik Deutz, who make the well-known Otto engines; the Deutsche Kraft Gesellschaft, at Berlin, makers of the Oechelhaüser two-cycle engine; and Körting Brothers, at Hanover, who build four and two-cycle engines for this class of work. All these motors have been repeatedly described. The arrangement of the cylinders may be tandem or side-by-side, and usually all the pistons, up to four, or even eight, work upon the same crank shaft. The Deutz firm has not made engines of more than 300-h. p. per cylinder; a four-cylinder engine would thus give 1,200-h. p. They have constructed 18 engines, with an aggregate of 5,900-h. p., and have 13 more, developing 7,450-h. p., in hand. At Dudelingen there are two 600-h. p. Deutz engines, and one of 1,000-h. p. The Societé Cockerill builds four-cycle engines of the Simplex type, developing 600-h. p. per cylinder; four of these would thus give an aggregate of 2,400-h. p. and 36,000-h. p. are now at work, or in course of construction. The Oechelhaüser two-cycle engines give 300-h. p., and up to 1,000-h. p. per cylinder; two would thus yield 2,000-h. p. with only two cylinders. Three of 1,800-h. p. are already at work, and 18, giving a total of 14,500-h. p., in course of construction. The Körting firm has made the two-cycle single-cylinder double-acting engine up to 500-h. p.; seven are now in hand, developing altogether 4,250-h. p., and amongst these there are two double-acting two-cycle engines with two cylinders, each giving 1,000-h. p.

Herr Lürmann, who has made the most careful study of this question, considers that after all the most important point—which was at first hardly considered at all—is the purification of the gases. Not only is this required for the proper working of the large gas engines, but it has also been proved that a smaller quantity of the purified gas is needed for the hot-blast stoves, thus leaving more available for power. As the operation of the blast by gas engines has proved entirely satisfactory, it is necessary to use very little gas under boilers for raising steam, and a larger proportion can be utilized in the engines. According to Herr Lürmann's calculations, based on the results of actual experience, the power which can be generated through gas engines directly is 3.6 times greater than that made available by burning the gas under boilers to raise steam; a gain, the amount of which can readily be appreciated. In German practice the consumption of gas in the gas-engine cylinders has been from 2.5 to 3.5 cubic meters per h. p. hour; and on this basis the available surplus per ton of pig iron made is from 12.5 to 28-h. p.

From experience obtained at Differdingen and elsewhere Herr Lürmann considers that the fan form of purifier is by far the best, and experiments have made it possible to determine a form which seems to give most satisfactory results. In all the arrangements hitherto made for cleansing blast furnace gases, one of the main difficulties has been the immense volume of gas to be purified and cooled, and consequently the large dimensions and high cost of the purifiers. Assuming that each ton of iron treated yields 4,500 cubic meters of gas, and that a furnace deals with 300 tons of pig iron per day, we get 1,350,000 cubic meters of gas per 24 hours, or 1,000 cubic meters per minute. Such a quantity can easily be managed in a fan. A liquid resembling thin whitewash flowed from the discharge pipes of the fan at Differdingen. This was the fine dust, and was run off into a clearing tank, of which there were three. Each held 60 cubic meters, and was sufficient to receive the liquid dust from gases feeding five to seven gas engines, each developing 600-h. p. After the dust has deposited in these tanks, they are flushed with water, and the dust carried away. If one fan is not sufficient to purify the gases, a second may be added.

The fan used at Differdingen, being originally intended for other purposes, was not provided with the junctions at the side necessary to connect it to the gas pipe. Fans designed for this special object are very strongly constructed, and may also be cooled with water if desired. They are maue single or double, to draw in air on one or both sides. The single section fan is coupled to an electromotor on the same foundation. The fans so far used are in two sizes, with vanes of 29½ in. and of 59 in. in diameter. The sections of the admission and discharge openings are very large. In the single fans they correspond with the smaller-sized vanes to a width of pipe of 16 in.; in the larger size to one 31 in. in width. With gases at a temperature of 122 degrees the fans can produce a pressure of 12 in. of water, the smaller-sized fan making 1,600 revolutions and the larger 800 revolutions per minute; if the temperature is higher, the pressure is less. The quantity of gas treated was 150 to 1,000 cubic meters per minute; power required to drive the fan without water, 15 to 90 brake horse power; weight of the single fan, from 750 kilogrammes to 5 tons. With double fans the breadth of the vanes can twice that of the single fans at the same speed and pressure; the power required and developed is about double, while the weight is only half as much again. The choice of a fan, therefore, will depend on whether it is to be connected to the gas pipe by one or by two pipes.

Whether it is advisable to use smaller fans or exhausters, with a diameter of the vanes of, say, 60 in., running at 800 revolutions per minute, treating 1,000 cubic meters of gas, and requiring 90-h .p . to drive them without water; or to use very large fans running at 138 to 170 revolutions per minute, requiring from 150 to 270-h. p., and treating 5,000 to 6,000 cubic meters of gas per minute, experience is needed to decide. In both kinds of fan, complete purification of the gases from dust and steam is obtained, if the water is admitted simultaneously, by the perfect mixing of the gas and water, and the constant whirling motion of the vanes. More power will be required if water is added than if air only passes through the fan. But if the question of cleaning the gases is more satisfactorily settled, there will be plenty of power to spare in blast furnaces, and no better utilization of it could be desired than that of purifying and cooling the gases.

So large a gain, as is shown by the statements given above, is well worth consideration, and it is somewhat surprising that no experiments have been made in this country in the direction of utilizing the waste gases. While our practice differs from the German in many points, especially as our ores are generally higher in iron than those used in Germany, so that the fuel consumed and the quantity of gas generated are less, while a much larger proportion of the gas is used in heating the blast, the existence of a considerable surplus still seems probable. It is certainly large enough to make an appreciable economy possible through its utilization; and it would seem to be of importance to our iron makers to ascertain how great that saving might be.—[Engineering and Mining Journal.

PERSONAL.

Chas. T. Boynton resigned last week as president of the Shelby Steel Tube Co., on the consummation of arrangements for the taking over of the company by the United States Steel Corporation as announced some weeks ago. Mr. Boynton was manager for a number of years of the Waukegan works of the Washburn & Moen Mfg. Co. On the absorption of the latter by the American Steel & Wire Co. he became general sales manager of the wire consolidation. In 1900, on the organization of the Shelby Steel Tube Co., the combination of the seamless tube plants of the country, Mr. Boynton was made president. His headquarters for a time were in Chicago and later in Cleveland. W. E. Miller, president of the original Shelby Steel Tube Co., and now chairman of the board of directors of the consolidation, succeeds Mr. Boynton as president.

Geo. D. Swift, who has been for a number of years assistant treasurer of the Lake Superior Consolidated Iron Mines, has been appointed to a similar position for the consolidated ore interests of the United States Steel Corporation, headquarters continuing at Duluth. H. J. Wessinger, heretofore superintendent of the Sauntry and Alpena mines, has been appointed mechanical engineer for the consolidated mining interests, and Frank Drake, of Ironwood, Mich., has been appointed mining engineer. It is the plan to erect at Duluth a fine building for the ore and vessel offices of the steel corporation.

Lawrence Phipps, of Pittsburg, who was officially connected with the Carnegie Steel Co. for many years, has purchased a home in Denver, Col., where he will probably spend his winters.

J. A. Vail, for 12 years Western agent of the Hooven, Owens & Rentschler Co., manufacturers of the Hamilton-Corliss engines, with works at Hamilton, O., with headquarters at St. Louis, has been promoted to the position of superintendent of the Ohio plant.

A. M. Rockwell, formerly with McCord & Co., Chicago, has accepted a position with Manning, Maxwell & Moore, and will have charge of the railway branch of the business at Chicago, with offices at 22 South Canal St.

R. H. Grant, formerly of the Grant Tool Co., Cleveland, has accepted the superintendency of the plant of the Standard Roller Bearing Co., of Philadelphia, and will have entire charge of the manufacturing department. Mr. Grant has had long experience in ball and roller bearing manufacture.

H. C. Frick has decided to erect a 15-story hotel at the corner of Grant St. and Fifth Ave., Pittsburg. On the opposite corner his new 22-story office building is being erected.

Geo. H. Bishop & Co., Lawrenceburg, Ind., have 200 men at work, day and night, and several months' work ahead. The company manufactures a line of hand-made saws, trowels, corn and cane knives.

An explosion in the machine casting house of the Ohio plant of the National Steel Co. at Youngstown, O., on Sunday morning, Aug. 18, cost the lives of seven workmen. Two were fatally burned while five received severe injuries. The tipping of a ten-ton ladle filled with molten metal, the latter coming in contact with water by which the machine cast pigs are cooled caused the explosion. The cast house was badly wrecked by the explosion while the molten metal was scattered in all directions, maiming and burning all the workmen in its path. Two causes are assigned for the tipping of the ladle. One is that the worm on the shaft was stripped by the great weight and the other that a bolt was broken.

The foundry operated in connection with the Oxford Machine Works, Oxford, N. J., was sold last week to Michael H. Repp and Charles Lapelt.

The Forsyth Pattern Co. of Youngstown, O., has been awarded the contract for making the patterns for the 26-inch mill to be installed in the new Mexican Steel Plant at Monterey, Mex.

It is reported that the officers of the Empire Steel & Iron Co. are considering the erection of a blast furnace with daily capacity of 250 tons at Oxford, N. J.

A STEEL WORKER ON THE AMALGAMATED ASSOCIATION.

The Amalgamated Association officers assumed in their original demand for the unionizing of all the plants of the three companies of the United States Steel Corporation, with which they were arranging a scale, that they represented all the workmen in those mills. The claim was entirely unfounded, as was the assertion frequently made by President Shaffer that the men in the various non-union mills would join the union if they were only allowed to do so. The following communication to a Pittsburgh paper by one of the Vandergrift, Pa., steel workers indicates that there are men with an independence and a sense of justice that contrasts sharply with the characteristics which show prominently in the course of the Amalgamated Association:

"As a steel worker I am much interested in the outcome of the present great strike. I have thought much over the present dispute. It seems to me when that element of citizenship, which furnishes the labor necessary to run the great factories and manufacturing establishments of this country, arrive at that state of intellectual development, where they become citizens of substantial worth, as well as a moral, intellectual and financial force to a community, then, and then only may all labor disputes be settled by arbitration. It is easy to talk about arbitration, but when an organization of men refuses to consider the interests of others, it then becomes a trust itself, and is striving to do that which it was organized to prevent. It might be for the best interests of labor if it were organized, but it should be on a basis broad enough to secure universal membership, and liberal enough to recognize the rights and best interests of others.

"The Amalgamated Association of Iron, Steel and Tin Workers is too narrow. It is still run on the same basis that it was when first organized. It has not kept pace with the great commercial expansion and growth of intellectual development of the United States. It seeks to keep its own members from advancement. It seeks to participate in the management of the mill by insisting on the continuance of the 'mill committee.' It would upset and partially destroy the commercial prosperity of the country by throwing idle many mills and stopping the production at a time when mills are crowded with orders, and a trade once lost is not easily regained. The present great supply of orders and demand upon our manufacturing resources has cost the business men of the country years of experience and millions of dollars. How any intelligent laboring man can contribute to the support of an organization that does not have the best interests of the whole country at heart is more than the writer can understand.

"It seems ridiculous that in this progressive age men will contribute to the support of an organization that is designed to keep them from advancement, and that is what many members of the Amalgamated Association do. An organization that would paralyze the business of the country, and throw thousands of unskilled laboring men out of employment because it is not permitted to dominate one of the greatest industries in the country is too selfish to deserve the support of general labor. The Federal Constitution and the several state constitutions, together with the enactments under their wise provisions are all the protection any good citizen of this country should require. I say let us have liberty and each man have the privilege of selling his own labor as we do in Vandergrift, one of the most harmonious and prosperous, as well as the best paid communities in the country.

"A Steel Worker."

"Vandergrift, Pa., Aug. 14, 1901.

At the Stirling Co.'s boiler works at Barberton, O., nearly 300 union men went on a strike this week. A workman recently employed refused to join the union and the management refused to discharge him on the demand of the union.

W. P. Snyder, of W. P. Snyder & Co., Pittsburg, has purchased a 40-acre tract of ore land in section 23, in northern Minnesota for $450,000. It is stated that Mr. Snyder has purchased this property on behalf of the Crucible Steel Co. of America, but nothing definite can be learned.

THE NEW CAMBRIA STEEL CO. DEAL.

At a meeting of the board of directors of the Cambria Steel Co. at Philadelphia, August 15, the capital of the corporation was increased to $50,000,000 from $4,320,000, and three new directors were elected. The new members are Leonard C. Hanna, of M. A. Hanna & Co., Cleveland; Frank J. Firth and Theodore N. Ely, of Philadelphia. Mr. Hanna has had charge of the Cambria Steel Co.'s ore business for years, the iron ore company being known as the Penn Iron Mining Co., and operating on the Menominee range. Mr. Firth is president of the Erie & Western Transportation Company, and Mr. Ely is superintendent of the motive power of the Pennsylvania Railroad. The new directors were chosen in the interest of the Pennsylvania Railroad, which now controls the Cambria Steel Co. The proposition to merge, with the Conemaugh Co. was ratified. The actual amount of money paid in under the recapitalization is $13,050,000, from which is to be deducted $200,000 commission to Drexel & Co. and $1,170,000 compensation to the underwriting syndicate. The Conemaugh Steel Co. increased its capital last week to $29,000,000.

INDUSTRIAL SUMMARY.

[If you are in need of machinery of any description, please notify *The Iron Trade Review*, and we will put you in communication with our advertisers at once.]

New Buyers in the Market and Some of their Wants:—

The business and plant of the Godfrey J. Bremer Machine Co. of Kalamazoo, Mich., has been taken over by the Bremer Machine Tool Co. Detroit capital is largely represented in the new company and it is possible the plant will remove to Detroit. The officers of the company are J. C. O'Hart, president; F. K. Wormer, Detroit, vice-president; C. C. Wormer, treasurer; F. G. Bremer, secretary, and G. J. Bremer, superintendent.

The American Carbon Motor Co. of Buffalo, N. Y., has been incorporated with a capital of $100,000. W. T. Thompson, J. L. V. Wood, H. H. Ball, J. Nelson Fierson and L. D. Wood of Buffalo, are the incorporators.

William Gardam & Son of New York is the name of a new company recently incorporated to manufacture machinery. The capital is $10,000. Joseph Gardam, C. W. Gardam, and J. W. Gardam are the incorporators.

The Ginners' Machinery Co. of Dallas, Tex., has been incorporated with a capital of $5,000, by William Burr, C. P. Wiggins and Frank Hanson.

The Altoona Foundry & Machine Co. of Altoona, Pa., was organized last week with a capital of $35,000 to carry on a general foundry and machine business. Directors of the new company are J. P. Levan, H. K. McCauley, B. M. Bunker, M. V. Orner and John A. Doyle. John P. Levan has been elected president and B. M. Bunker, secretary and treasurer.

The New Castle (Pa.) Stamping Co. has been incorporated with a capital of $100,000. The directors are George L. Patterson, T. F. Morehead, L. M. Raney, C. J. Kirk and A. W. Oberman, of New Castle. A stamping mill will be erected at New Castle.

An application for a charter for a new sheet mill to be erected at Carnegie, Pa., will be made on September 6. The new company will be known as the Carnegie Sheet Steel Co. Robert G. Gillespie, W. H. Skivington, D. R. Torrence, J. R. Paull and T. B. Everson are the incorporators.

Application has been made for a charter by the Cornwall Iron Co. of Lebanon, Pa. E. C. Freeman, R. P. Alden, I. C. Freeman, M. C. Buckingham and S. C. Derby are the incorporators.

The Iowa Iron & Steel Co. of Des Moines, Ia., has been incorporated with a capital of $1,000,000. The incorporators and directors are T. G. Rutledge, A. K. Prince, C. W. Bates and William Ingram.

Crab Orchard (Tenn.) Coal & Coke Co. is in the market for a new or second-hand hoisting engine.

The Steel Wheel & Wagon Co. of Pueblo, Col., was incorporated last week with a capital of $350,000. W. H. Schofield, E. H. Wright, S. I. Heyn, G. W. Bowen and R. H. Lee are the incorporators. The new company will manufacture wagons entirely from steel. The Schofield wagon was described in our issue of May 30.

The Wisconsin Machinery & Mfg. Co. of Madison, Wis., has been incorporated with a capital of $25,000. L. E. Vogel, W. W. Vogel and J. W. Otto are the incorporators.

A charter of incorporation has been granted to Thos A. Hickey, J. Hardy Krigler and Paul W. Ryder as electricians, mechanical engineers and manufacturers under the name of the Falcon Electric Co., Jersey City, N. J., capital, $225,000.

The American Wire Washer Co., Jersey City, N. J., has been incorporated by Herbert C. Hart, J. Hardy Krigler and Paul W. Ryder, and will manufacture washers from wire. Capital, $500,000.

Cardwell Machine Co., Richmond, Va., wants an air compressor, 80 pounds pressure, suitable for running about 10 pneumatic tools; prices on both new and second-hand.

The Veneer Packing and Machine Co., Cleveland, has been incorporated at Dover, Del., with a capital of $500,000.

Andrew Crawford, J. E. Challenger, Rodman Smith, Geo. W. Williams and R. C. Markley, Camden, N. J., have incorporated the Spalding-Robbins American Rotary Plow Co. Capital, $100,000.

Vaughan & Fuller, Winchester, Tenn., want lathes, shaper, etc., and about four or five-h. p. electrical motor.

The capital stock of the Pennsylvania Engineering Works is to be increased from $150,000 to $225,000, in order to enlarge the works. The plant was originally built by James P. Witherow. The new company assumed control in November, 1899. The old wooden machine shop is to be torn down and a steel and brick structure 284 by 90 feet will be erected.

The Cleveland Cap Screw Co. of Cleveland, recently organized with $250,000 capital stock, will manufacture special lines of cap screws. The company is making extensive improvements to its plant, formerly occupied by the Grant Tool Co., installing new boiler and engine equipment, also electrical equipment for electrical welding, which will enter largely into the products. The plant will be in full operation in the fall. D. J. Kurtz, president of the company, was for 25 years connected with the William Bingham Co., and more recently was president of the O. P. Clay Stamping Co. F. E. Bright, the vice president, and H. V. Bright, treasurer and general manager, have been identified with the manufacture of metal specialties in Cleveland for several years. Samuel M. Mather, secretary, was connected with the William Bingham Co. for 12 years.

New Construction:—

Lane Lyle, Chattanooga, Tenn., who recently formed the Standard Machinery Co., has awarded contract for erection of a two-story brick machine-shop building to cost $10,000.

It is rumored that a company will be formed by local and foreign capitalists for the erection of a basic-steel plant on the Chesterfield side of James river. John L. Williams & Sons, Richmond, Va., have purchased controlling interest in the Old Dominion Iron & Steel Works this week, and it is rumored they may have in contemplation the steel company noted.

Aubrey Pool of Glen Jean will remove his shop to Curlew, Va., and erect a plant there for the manufacture of mining tools.

The Whitney Car Wheel Co. has made plans for its new plant at South Camden, N. J. It will consist of a main foundry of brick, 100x200 feet, a one-story brick engine house, 40x40 feet, a two-story brick machine and pattern shop, 50x80 feet, a one-story brick core shop, 25-25 feet, and a three-story buff brick office, 20x25 feet. The cost of the ground, buildings and machinery will amount to about $150,000. Since the first announcement of the project the company has reorganized, electing Joseph McClain of New York president, and re-electing J. Lancaster Dailey of Philadelphia vice-president; J. Fernley Brooks, secretary, and Joseph P. Mumford, treasurer.

The Altoona Foundry & Machine Co., Altoona, Pa., has been organized and will erect a malleable iron foundry. The capital, $30,000, has been subscribed and the land purchased for the plant. The directors are: John B. Leven, president, B. M. Bunker, secretary and treasurer, H. K. McCauley, M. V. Orner and John A. Doyle.

The Orvis Plow Factory at Dixon, Ill., is being refitted

throughout for the Reynolds Wire Co. This plant will be used for the manufacture of novelties.

The Globe Wire Works of Springfield, Mass., will erect a new two-story building in which a complete wire working plant will be installed.

Pierce, Butler & Pierce are erecting a new foundry building at Eastwood, N. Y.

The Western Machine Tool Works of Grand Rapids, Mich., have been given a site in Holland, Mich., on which they will erect a machine shop, 50x100, and an engine and boiler house, 35x45, and a work room.

A permit has been issued to the Atlas Engine Works, Indianapolis, Ind., for a brick foundry, costing $25,000.

A brick addition, 200x48, will be built to the plant of the South Bend (Ind.) Chilled Plow Co.

Improvements costing $100,000 will shortly be made at the plant of the Pennsylvania Engineering Co., New Castle, Pa. The capital stock will be increased from $150,000 to $225,000. An addition is to be built to the present machine shop, 140 x 90 feet. It will be of brick and steel construction. There will be a gallery 16 feet above the ground floor. Upon the south side this gallery will be 22 feet wide and 88 feet long and in this the pattern shop will be located. A new 30-ton traveling crane will be ordered, and for the boiler shop a 60-inch combination punch and shear.

The Harris Toy Foundry, Toledo, O., has been completed and was placed in operation last week. The building is 450 by 80 feet. The output consists of light gray iron castings.

The Taunton Locomotive Co. of Taunton, Mass., has decided to build a foundry at a cost of $20,000.

Caldwell & Watson, Birmingham, Ala., have let the contract for foundry and machine shop buildings to cost $18,000. The buildings are 75x195 feet each.

The Variety Iron Works, Cleveland, will erect a brick boiler shop in connection with their plant at a cost of $5,000.

The Tennessee Coal, Iron & Railroad Co. reported recently as planning to build large shops at Ensley, Ala., states that it has some plans for enlarging and possibly rebuilding the shops, but has not finally decided what course it will pursue.

The Leighton Machine Co., Cleveland, is having a large brick addition built to its plant on Madison Ave.

Means & Fulton Iron Works of Birmingham have received contract at $60,000 for improvements at Thomas, Ala., for Republic Iron & Steel Co.; improvements include erection of steel stockhouse 639x91 feet, stockyard to handle ore and limestone and 244 bins.

The Pawtucket Mfg. Co., Pawtucket, R. I., manufacturer of bolt and nut machinery, is enlarging the plant and will add a structure 110 feet long, two story with basement, to the machine shop and a 96x40 feet addition to the bolt forging department and a 64x40 building to the machine forging department.

The American Valve Co., Coxsackie, N. Y., has purchased a lot 220x600 feet and will build a machine shop 120x40 of brick and steel construction.

The Ludlow Valve Mfg. Co., Troy, N. Y., has well nigh completed extensive additions to the plant and employment will be given to 100 more men in the foundry and machine shop.

The American Brass Co. has begun the erection of an extension, 30x100, to the rod manufacturing department at the Kenosha, Wis., plant.

An erroneous statement is being circulated that C. H. Besly & Co., of Chicago, will erect a factory near Clybourn Junction, Chicago, for the manufacture of brass. The factory is being erected by Brown & Besley for the production of patent letter files.

The Youngstown Mfg. Co. of Youngstown, O., broke ground at Struthers, O., for its new manufacturing plant last week.

The new owners of the Minerva furnace located at Milwaukee, Wis., have decided to rebuild the furnace almost entirely.

An addition 60 x 100 feet to the plant of the National Pipe Bending Co. of New Haven, Conn., will be erected.

The John Baizley Iron Works of Philadelphia, Pa., will erect a new boiler shop 45 x 78 feet.

The American Ax & Tool Co. has decided to still further enlarge its plant at Glassport, Pa., by the addition of a new building. The building will be 720 feet long and 150 feet wide. The machinery of the plants at Ballston Spa, N. Y., Augusta, Me., East Douglass, Mass., and Lewiston, Pa., will be installed in this building.

At Johnstown, Pa., a four-mill tin plate plant will be erected by a new company composed of Johnstown capitalists and headed by W. K. DuPont. The Cambria Steel Co. will supply the raw material for the plant.

The Girard Stove & Repair Co., Girard, O., has been organized to make stove castings and repair work and will build a foundry at Mosier.

The United Boiler Co., Girard, O., will install several electric cranes and build an addition to the plant, two stories high and 100x96 feet.

The Republic Iron & Steel Co. has given a contract to the Geo. B. Sennett Co., Youngstown, O., for parts of the new 26-inch billet mill now being built at the Bessemer works in that city. Several large tables are included in the contract.

The Lehigh Foundry Co., New York, will erect an 80-foot addition to their plant at Fullerton, Pa.

The Taunton Locomotive Mfg. Co., Taunton, Mass., is to build a foundry at a probable cost of $200,000.

Fires and Accidents:—

Humphrey's foundry at Joliet, Ill., was damaged to the extent of $20,000 by fire last week.

Fire did $1,000 worth of damage to the A. C. Williams Iron Works at Ravenna, O., last week.

Fire damaged the plant of the Reading Foundry Co., of Reading, Pa., to the extent of $1,500 last week.

The plant of the Hydraulic Machine Co., located at Pittsburg, was damaged to the extent of $5,000 by fire last week.

The plant of the Eclipse Machine & Boiler Works, at Chicago, Ill., was completely destroyed by fire recently. The loss is estimated at $15,000.

At Columbus, O., the plants of the Eureka Foundry Co. and the Moon Stove & Range Co. were completely destroyed by fire Aug. 17. The loss on the foundry is $7,000, insurance $3,000, and that on the range works is $18,000, with insurance of $7,000. Both plants will be rebuilt.

The West and Northwest:—

The Cleveland & Barr Foundry Co., Chicago, has been incorporated with a capital stock of $25,000. The incorporators are Robert J. Cleveland, Robert C. Barr and Louis Haldermann.

The Sanitary District of Chicago, will shortly begin the construction of a modern type bascule bridge at Randolph street, Chicago, at a cost of $175,000.

The Wisconsin Foundry & Mfg. Co., Racine Junction, Wis., capital, $10,000, has been incorporated by Hans W. Hayden, H. L. Gude and F. W. Glahn.

The Hall Electric & Mfg. Co., of Chicago, Ill., has been incorporated with a capital of $50,000, to manufacture electrical goods and machinery. Samuel L. Crill, O. A. Harding and F. E. Koehler are the incorporators.

The American Steel & Wire Co., Chicago, is building an addition, 300 x 100 feet, to its warehouse at Waukegan, Ill.

The Washington Tool Co., Owatonna, Minn., will add a boiler house, 20 x 27, and an engine house, 26 x 18, to its plant in that city.

The Gadsden Light, Coal & Ice Co., Gadsden, Ala., is in the market for a 250-h. p. compound engine. fll

The Columbia Enameling & Stamping Co., Terre Haute, Ind., is having plans prepared for a plant to be erected in that city which will consist of warehouse, stamping department, annealing shop, power house and several smaller buildings, to be erected at a cost of $200,000.

It is reported that a deal has been arranged between Studebaker Bros. Mfg. Co., South Bend, Ind., Niles & Buchanan, Dowagiac, Mich., and Lee & Porter, Buchanan, Mich., for the purchase of the plant of the Lee & Porter Axle Works at Buchanan, and the establishment on its site of a mammoth axle and wagon spring works. The entire spring department of the Studebaker Mfg. Co., it is stated, is to be removed there.

The Eagle Horseshoe Co., Milwaukee, Wis., whose plant was recently destroyed by fire, will begin rebuilding at once. The buildings and machinery for the new plant are to cost $150,000, and include a rolling mill, 104x176 feet; another of 60x100 feet;

a machine shop, 30x60 feet; scrap-iron house, 50x250 feet; two horseshoe warehouses, 60x100 feet each, and two additions to present buildings, one of 40x60 feet and the other 40x16 feet. A new horseshoe department with new boilers, furnaces and engines will also be erected.

The Chicago Pneumatic Tool Co., Chicago, has received another large foreign order, making the total number of tools called for in foreign orders received in the last 60 days about 2,000.

The Keystone Woven Wire Fence Co., Peoria, Ill., expects to occupy the new buildings which it is having erected, by Oct. 1. These buildings will be 284x81 and 165x36 feet, respectively.

The Marinette Iron Works Co., Marinette, Wis., has secured the rights to manufacture the Kimpling rock crusher, a new machine of great power and large capacity.

The J. I. Case Plow Works, Racine, Wis., contemplate the expenditure of from $75,000 to $100,000 in new buildings. These improvements include a four-story brick warehouse, 100x300; an addition to the factory three stories high, 50x225, and a modern office building. The city council having given permission to close certain streets which have interfered with the construction of these buildings, it is expected that work will be immediately commenced on them.

The National Wrought Iron Annealing Box Co., Alexandria, Ind., will erect a plant in that city for the manufacture of annealing boxes.

The Siegrist Lubricator Co., St. Louis, Mo., has received a contract for the installation of its system in the plant of the De Beers Consolidated Mines Co., Kimberley, South Africa. The company recently completed an installation in the plant of the Glasgow Tramways Co., Glasgow, Scotland.

The Central Iron Works, Des Moines, Ia., has been incorporated with a capital stock of $6,000. The incorporators are P. L. Larson, Elmer Jakway and Charles Olson.

The Maywood Foundry & Machine Co., Chicago, has received an order from the Buckeye Malleable Iron Co., Columbus, O., for a large equipment of molding machines for making couplers, link chains, etc.

The Armstrong Bros. Tool Co., Chicago, has received an order from V. Loewener, Copenhagen, Denmark, for a large shipment of gang tools; also a large order for tools from Charles Churchill & Co., London. This is the third order in one month which the Armstrong Bros. Tool Co. has received from the latter company. It reports that its foreign business is growing at a very rapid rate.

An error was made in a recent issue of *The Iron Trade Review* in regard to the order for the power equipment of the plant of the Waukesha Sheet Steel Co., Waukesha, Wis. In this item, it was stated that the Niles Boiler Co., of Niles, O., had received the order. The order instead was given to G. A. Mullins, 226 LaSalle St., Chicago, and consisted of 1,500-h. p. Lynn vertical water tube boilers, 1,500-h. p. Cookson special feed water heater and purifier, and two 1,500-h. p., outside packed plunger Dean pumps. The motors and generators were furnished by the Northern Electric Mfg. Co., Madison, and the boilers were equipped with the Green traveling link grates furnished by the Green Engineering Co., Western Union Bldg., Chicago.

Harrington & King Perforating Co., Chicago, manufacturer of perforated metals for all purposes, reports a very satisfactory business from the domestic trade in the past month. Notwithstanding the unsettled labor conditions the company has received some good sized orders from all classes of trade, and in filling these every department of its plant has been kept extremely busy.

The Maywood Foundry & Machine Co., Chamber of Commerce, Chicago, has furnished the American Malleable Casting Co., Chicago Highlands, Ill., with three sets of oil box machines, and has also built for the plant of the latter, three 50-h. p. gasoline engines.

General Industrial Notes:—

The plant of the Elmira Steel Co. at Elmira, N. Y., which was recently sold by the order of the court will shortly resume operations. The new owners of the property are making repairs and new machinery is being installed.

At the annual meeting of the Highland Iron & Steel Co. of Terre Haute, Ind., held last week the officers and directors were re-elected. Phillip Matter is president, William M. Myers, secretary, and Walter C. Ely, treasurer and general manager.

The Buckeye Saw & Mfg. Co., of Columbus, O., made an assignment last week. The assets of the company are placed at $3,000 and the liabilities at $7,000.

The Racine Steel & Iron Co. of Racine, Wis., has increased its capital stock from $50,000 to $60,000. J. G. Johnson is president and treasurer; C. W. Hawes, vice-president; G. N. Prentiss, secretary and general manager.

The plant of the Groton Bridge Co. of Groton, N. Y., one of the plants operated by the American Bridge Co., has been shut down for an indefinite period.

The Webster, Camp & Lane Machine Co. of Akron, O., has changed its incorporate name to the Webster, Camp & Lane Co. Work is progressing on the new plant the company is to build on the southern outskirts of Akron. Its present plant, in the business section of the city is much cramped.

Stockholders of the recently incorporated United States Engine Co. of Parkersburg, W. Va., last week elected the following directors: Henry P. Boyd, H. P. Boggs, Thomas Gartlan, W. H. D. Chapin, W. W. Walker, W. S. Mowrie, W. H. Zahniser, O. P. Boggs and James G. Gormley. Officers were elected as follows: H. P. Boyd, president; Thomas Gartlan, vice-president; J. F. Boggs, treasurer; Daniel F. Reese, secretary.

The new fire brick plant operated by Gardner Bros. at Ellerslie, near Cumberland, Md., commenced operations last week.

One of the furnaces of the Burden Iron Co. at Troy, N. Y., will shortly be relighted. The furnaces of the company have been out of blast for nearly two years.

The Old Dominion Iron & Nail Works at Richmond, Va., has passed under the control of Messrs. John L. Williams & Sons. The transfer of the majority of the stock was made last week. The company is capitalized at $300,000.

The Girard Mfg. Co., Girard, O., has been reorganized with W. S. Kernohan as president; A. W. Kennedy, treasurer; A. B. Camp, secretary; C. B. Sill, manager, and Frank H. Klipp, superintendent.

The new plant of the Youngstown Iron & Steel Roofing Co. at Youngstown, O., will be placed in operation early in September. The new mill consists of four hot sheet mills and two sets of cold rolls. A bar mill and two sheet bar heating furnaces, one double puddle furnace, one double scrap furnace, one sheet furnace, two double annealing furnaces and a galvanizing department.

The two rod mills of the Sharon Steel Co., Sharon, Pa., are in full operation. Each mill reduces a 30 ft. 1¾ in. billet to a No. 5 rod.

The Pratt & Letchworth Co., Buffalo, is putting in a new air furnace.

The Buffalo Forge Co., Buffalo, is installing a new direct-connected engine and generator at its works.

The Carborundum Co. of Niagara Falls, N. Y., is erecting a brick office building.

The Reading Iron Co., Reading, Pa., will rebuild the Crumwold Furnace, recently destroyed by fire at Emaus, Pa.

The Sprague Electric Co. is receiving orders for its apparatus from all parts of the country and abroad. Among a few recent orders are the following: 90 k. w. split-pole generator shipped to Bailey, Walker & Co., Buenos Ayres, S. A.; 125 k. w. split-pole generator, Steelton Light, Heat & Power Co., Steelton, Pa.; 37½ k. w. split-pole generator, Ft. Wadsworth, Staten Island; 37½ k. w. engine type generator, Ft. Hancock, N. J.; 80 h. p. motor, American Linseed Co., Staten Island; 100 k. w. engine type split-pole generator, Geuder & Paeschke Mfg. Co., Milwaukee; 50 k. w. generator and 15 h. p. motor, Roe & Conover, Newark, N. J.; 85 h. p. motor, John Stephenson Co., Elizabeth, N. J.; 75 k. w. split-pole generator, Chase Rolling Mill Co., Waterbury, Conn.; 100 k. w. 550 volt split-pole belted-type generator, Plymouth Mills, Plymouth, Mass; 100 k. w. belted-type split-pole generator, C. S. Ashley, Toledo, O.; 100 k. w. 550 volt belted-type split-pole generator, and various motors up to 50 h. p., T. C. Keller, Chicago; a quantity of motors for the mines and refining plant of the Arlington Copper Co., Arlington, N. J.; 100 h. p. motor, American Locomotive Co., Cooke Works, Paterson, N. J.; 60 k. w. split-pole generator, Fahys Watch Case Co., Sag Harbor, L. I.

COCHRANE OIL SEPARATORS.

VERTICAL FORM.

There are lots of engineers and steam users who do not believe *Oil CAN BE easily and successfully removed from exhaust steam.* Fact is, they are wasting tons of good, pure water, and tons of coal that cost money, rather than take any chances—either because they have heard of plants where failures were made, or because they had a few personal experiences—and yet we, with our COCHRANE OIL SEPARATORS are giving the very results they think cannot be obtained! We are giving thorough and complete protection to boilers from the oil in the exhaust steam used for heating, by direct, actual contact, the water fed into these boilers, or from the oil in exhaust steam used in heating systems where the condensation is returned direct.

If we had out only one or two successful Oil Separators, or only a half dozen, or maybe fifty all told, some doubt might exist that we could help them, conditions varying in different plants; then not everyone can afford the time to investigate the hows and the whys—so we just clinch all our arguments that exhaust steam, because a waste product, should be used wherever possible, by referring to the fact that *more than four millions (4,000,000) of horse power of boilers are kept free from oil by*

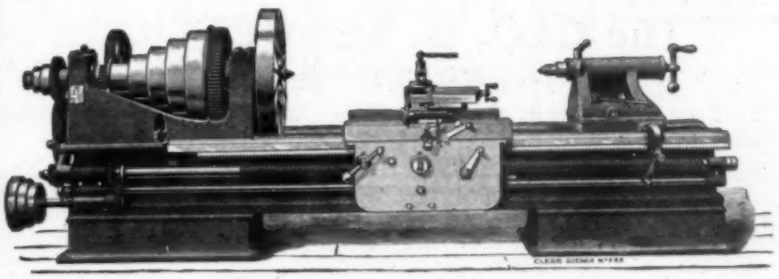
COCHRANE OIL SEPARATORS!

If we can do it for so many boilers, the chances are mighty good that we can protect your boilers, no matter what the conditions, for our experience gives us the knowledge of what we can and what we cannot do.

Let us have the particulars of your case. We will help you solve the problem of how to properly utilize your exhaust steam.

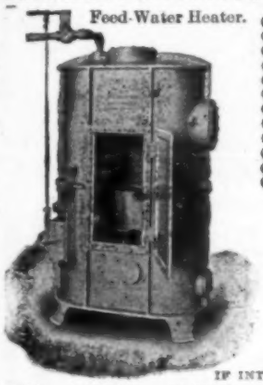
HARRISON SAFETY BOILER WORKS, Clearfield & 17th Streets, Philadelphia, Pa.

Schumacher & Boye, CINCINNATI, O.



Engine Lathes.

Send for Catalogue D.



Feed-Water Heater.

Feed Water Heaters

Cut herewith illustrates Stilwell's latest design. **Made entirely of cast iron.** Saves fuel and filters the feed water for steam boilers. Use only exhaust steam.

BOILER FEED PUMPS

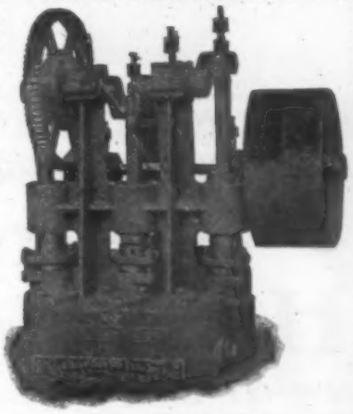
Single, Duplex and Triplex.

AIR COMPRESSORS

Jet - Condensers - Surface

IF INTERESTED ADDRESS

The Stilwell-Bierce & Smith-Vaile Co., 227 Lehman Street, DAYTON, OHIO, U. S. A.



Triplex Boiler Feed Pump.

The ROBERT FIELD COMPANY,

20 Hayden Building, COLUMBUS, OHIO

Selling Agents for

"SLOSS," "FLORENCE," "LADY ENSLEY" and "SHEFFIELD" brands of Alabama Foundry and Forge Pig Iron.

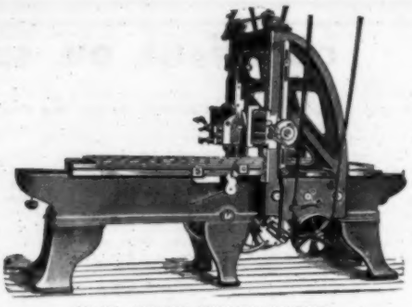
"GLOBE," the best Jackson County Ohio Silvery Softener.

"Alexandria," "Preston" and "Bessemer" Connellsville Foundry Coke.

"CLIMAX" Kanawha Foundry Coke. Smithing Coal.

Western Office, ST. LOUIS, MO.

MACHINE TOOLS AND SUPPLIES
SEND FOR CATALOGUE



16 IN. SWING ENGINE LATHE.

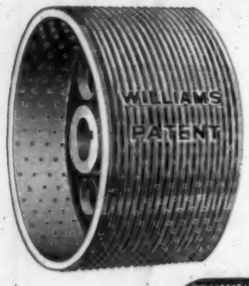
TRADE MACHINERY MARK

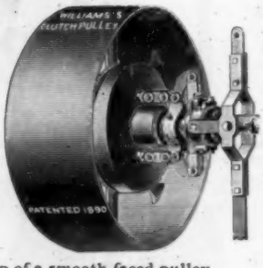
NEW and SECOND HAND MACHINE TOOLS READY FOR IMMEDIATE DELIVERY.

WRITE FOR PRICES AND PARTICULARS.

U. BAIRD MACHINERY CO., Pittsburg, Pa.

The Williams Patent
Pneumatic Pulley





Double the grip of a smooth-faced pulley.
Guaranteed satisfaction or no sale.

MILTON F. WILLIAMS & CO.
St. Louis, Mo.

Iron Castings,
Machinery and Forgings

The GEO. B. SENNETT CO.,
YOUNGSTOWN, OHIO.

Rolling Mill, Blast Furnace Work and General Machinery.

CORRESPONDENCE SOLICITED, AND ESTIMATES PROMPTLY FURNISHED ON ALL KINDS OF MACHINERY, CASTINGS AND FORGINGS.

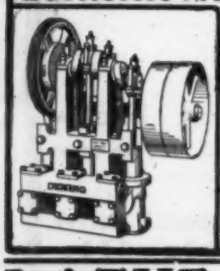
Every Mill Man
Should Keep Posted by Reading
Power and Transmission

a unique publication in trade literature exclusively devoted to MODERN POWER TRANSMISSION ENGINEERING
Copiously illustrated with typical installations. Other articles of interest to the up to date factory are also contained in each issue. Sample copy free by applying to
THE DODGE MANUFACTURING CO. ENGINEERS FOUNDERS MACHINISTS MISHAWAKA, IND. U.S.A.
BRANCHES ~ BOSTON NEW YORK CHICAGO CINCINNATI ATLANTA LONDON, ENG.

- Steam -
Hammers
of every description are our specialty.

Pittsburgh Shear Knife and Machine Co.,
PITTSBURGH, PA.

TRIPLEX PUMPS
PROVIDE
ECONOMIC WATER SUPPLY



OPERATED BY
GAS ENGINE
ELECTRIC MOTOR
etc.

THE DEMING CO.
MAKERS OF
PUMPS FOR ALL PURPOSES
SALEM OHIO.

HENION & HUBBELL
GENERAL WESTERN AGENTS ~
61-69 NORTH JEFFERSON ST.
CHICAGO, ILL.

CLEVELAND
LONG STROKE RIVETING
HAMMERS are the most efficient and durable Pneumatic Hammers on the market.
Most rapid and strike the most powerful blow.
That means satisfactory work and economy of time.

OUR PNEUMATIC
HAMMERS for Chipping, Calking and Flue Beading are Just as good.
Latest ideas, best workmanship and materials, make Cleveland Pneumatic Tools the best in the world.
WRITE FOR CATALOGUE

THE CLEVELAND PNEUMATIC TOOL CO., 74 Frankfort St., Cleveland, O.

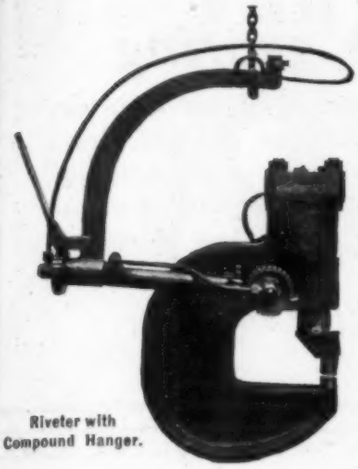
LATHE and PLANER
TOOLS.
THE NEW KIND.
ALL SIZES.

Using inserted Self-Hardening steel cutters. Saves forging, dressing, tempering, 90% tool steel, 70% grinding.
New Tools. New Catalogue. Keep Posted.

ARMSTRONG BROS. TOOL CO., Chicago, Ill.

Write us for any technical book you want. We can furnish it.

THE IRON TRADE REVIEW,
Cleveland, O.



Riveter with Compound Hanger.

R. D. WOOD & CO.,

400 Chestnut Street, PHILADELPHIA, PA.

HYDRAULIC RIVETERS, Fixed and Portable.

PUNCHES, SHEARS, CRANES, PRESSES AND LIFTS.

Hydraulic Valves. Cast Iron Pipe.

MATHEWS FIRE HYDRANTS.

Gate Valves. Valve Indicator Posts. Pumping Engines. Producer Gas Plants.

Quick Work Good Work

ELASTIC ROTARY BLOW RIVETING MACHINE

Strikes 3,000 blows per minute. . . . For riveting Hardware, Bicycle Chains, Agricultural Implements, Mechanics' Tools, etc. . . . . .

MANUFACTURED BY

F. B. Shuster Co.

NEW HAVEN, CONN.

Water, Gas *and* Steamfitters' Tools

No. 0 Threading Machine. Power Attachment.

ARMSTRONG Adjustable Stocks and Dies.

Vises (hinged), Improved Wrenches, Pipe Cutters, Clamp Dogs, etc. Improved Pipe Threading and Cutting-off Machines. . . Hand or power. . .

Our No. 0 machine is designed for threading the smaller sizes of pipe—iron or brass—also bolts.

The **ARMSTRONG MFG. CO.,**

Bridgeport, Conn.

No. 56 Hand Machine. Range 2½-6 in. S. H.

FORBES PATENT DIE STOCK

and one man can with ease cut off and thread 12-inch pipe.

Smaller Sizes Proportionately Easy.

Send for Catalogue.

The Curtis & Curtis Co.

37 Garden St., BRIDGEPORT, CONN.

When you write to firms advertised in our columns, please mention the fact that you took their address from our paper. They will thank you for it.

ELEVATORS AND CONVEYORS

FOR

Slag, Ore, Skelp, Bar Iron, Coal, Ashes, Pig Iron, etc.

Power Transmission.

Link-Belt Machinery Co.

CHICAGO.

THE

McKIM GASKET,

Made of packing encased in Soft Rolled Annealed Copper.

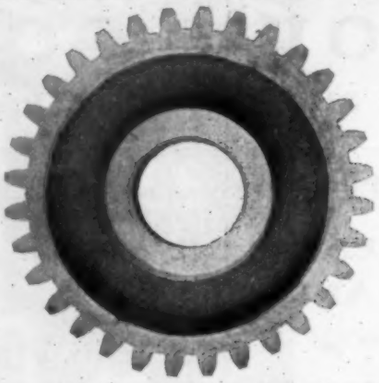
Cannot Blow Out. . . . . .

Can be Reapplied Indefinitely.

Made for all sizes pipes, flanges and manhole and handhole plates for boilers.

McCORD & COMPANY,

Old Colony Building, CHICAGO. 100 Broadway, NEW YORK.



Side line gearing

is quite common these days, but is it as accurate and practical as gearing produced by a firm who make a specialty of Gearing? Gearing is a specialty with us —we make it in all sizes and make it right.

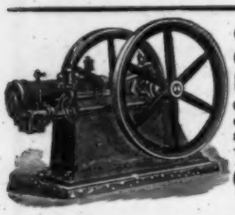
R. D. Nuttall Company
PITTSBURG, PA.

GEAR CUTTING.

Spur Gears,
Bevel and Mitre Gears,
Worm Gears,
Spiral Gears,
Internal Gears.

¾ to 30 inches diameter.
48 Diametral to 2 inch Circular pitch.

F. H. BULTMAN & CO.,
100-108 Canal St., CLEVELAND, O.



GAS AND GASOLINE ENGINES.

Cheap and convenient power for any service.
Write for catalogue
COLUMBUS MACHINE CO.
COLUMBUS, O.

Machinery For Reducing and Pointing Wire

By Compression or Cold Swaging.

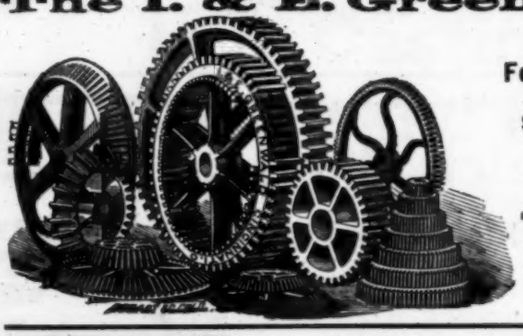
Especially adapted to Pointing Wire Rods and Wire for Drawing. For machines or information, address

S. W. GOODYEAR,
Waterbury, Conn.

Did You Ever See a Copy of THE FOUNDRY

the only foundry journal published?
SEND FOR ONE. FREE.
THE FOUNDRY, Cleveland, O.

The I. & E. Greenwald Co.

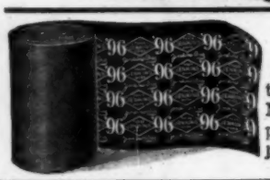


Engineers,
Founders and Machinists.

Steam Engines, Shafting, Hangers, Pulleys, Sprockets Wheels, Chains, Etc., Etc.

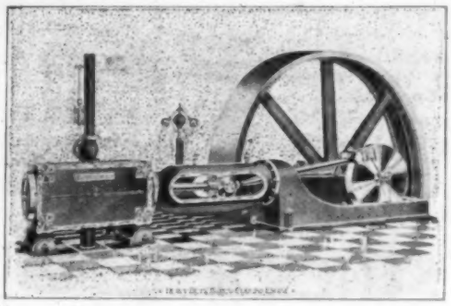
Headquarters for Mill Gearing of all kind and sizes.
Steam Power Plants complete.

720 East Pearl Street,
CINCINNATI, O.



Jenkins '96 Packing.

Pronounced by steam users throughout the world the best joint packing manufactured. Expensive? Not at all, as it weighs 30 per cent less than many other packings, consequently is much cheaper.
JENKINS BROS., New York, Boston, Philadelphia, Chicago.

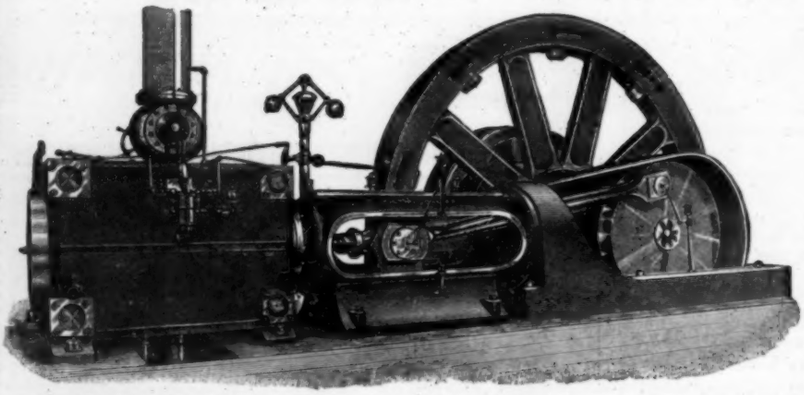


Complete Steam Plants.

Corliss Engines, Feed-Water Heaters and Purifiers, Tubular and Water Tube Boilers.

G. A. MULLINS,
226 La Salle Street,
CHICAGO.
Telephone Main 2881.

THE HOOVEN, OWENS, RENTSCHLER CO., *Hamilton, Ohio.*



Hamilton Corliss Engines.

Engines for ROLLING MILLS, ELECTRIC RAILWAYS and ELECTRIC LIGHT.

ENGINES OF ALL SIZES AND FOR ALL PURPOSES.

46 South Canal St., Chicago.
39 and 41 Cortlandt St., New York.
Laclede Bldg., St. Louis, Mo.
C. C. Moore & Co., San Francisco, Cal.

Pittsburg is becoming known as a banking and money center as well as a manufacturing point. Its Stock Exchange is the market for most of the iron and steel securities.

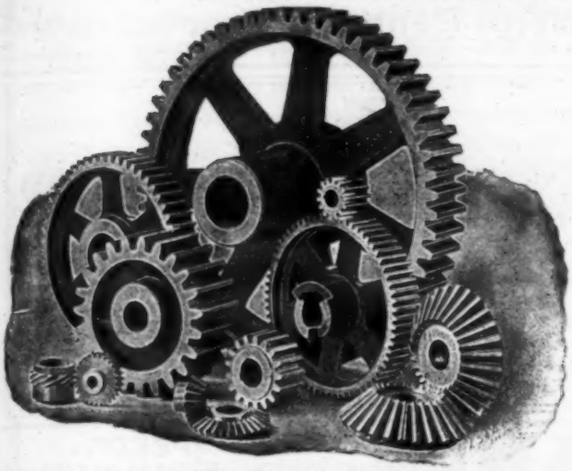
Robert C. Hall,

Member of the Pittsburg Stock Exchange,

will be pleased to secure information or make transactions in these stocks at any time. Phone Court 3613 or 345 Fourth Ave., PITTSBURG, PA.

The Van Dorn & Dutton Co.,

General Machinists and Engineers,



Manufacturers of

Cut Gears and Pinions.

Spur Gears, Spiral Gears, Bevel Gears, Worms and Racks.

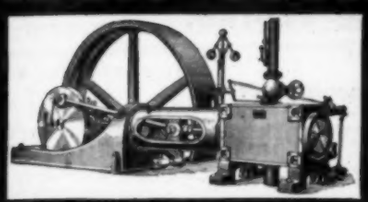
GEAR CUTTING

OF ALL DESCRIPTIONS.

Teeth Planed in Bevel Gears Theoretically Correct by Latest Improved Machinery.

Material and Workmanship the Best. **Write for Estimates and Prices.** **CLEVELAND, O.**

ALLIS-CHALMERS CO.,



Builders of

REYNOLDS CORLISS ENGINES.

PUMPING, BLOWING AND HOISTING ENGINES.

General Offices: **CHICAGO.** Home Ins. Bldg.

M. ALLEN, President.

WM. B. FRANKLIN, Vice-President.

F. B. ALLEN, Second Vice-President.

J. B. PIERCE, Secretary and Treas.

HARTFORD STEAM BOILER INSPECTION AND INSURANCE CO. HARTFORD, CONN.

BURWELL & BRIGGS, General Agents, 32 and 33 Clark Bldg., 208 Superior St., Cleveland, O.

C. A. BURWELL, Chief Inspector, 32 and 33 Clark Bldg., 208 Superior St., Cleveland, O.

J. H. WOLCOTT, Special Agent, 32 and 33 Clark Bldg., 208 Superior St., Cleveland, O.

Southwark Foundry & Machine Co.

PHILADELPHIA PA.

Porter-Allen Automatic Engines.
Blowing Engines, Centrifugal Pumps,
Weiss Counter-Current Condensers.

The William Tod Co.

YOUNGSTOWN, OHIO.

The PORTER-HAMILTON ENGINE.

Reversing Engines, Blowing Engines, Converters, Hydraulic and special heavy machinery for the iron and steel trades.

Park Building, PITTSBURG, = = Seward S. Babbitt.

SAVE YOUR BOILERS

BY THE INSTALLATION OF

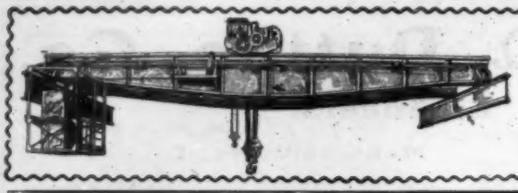
The Ideal System of Water Purification.

The Pittsburg Filter Mfg. Co.,

Empire Bldg., PITTSBURG, PA.

☞Write for Catalogue.

When writing to advertisers, kindly mention this paper.



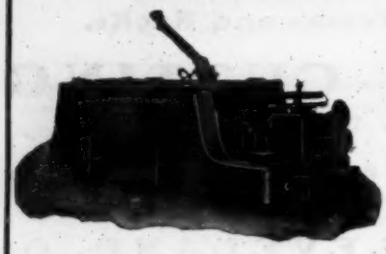
HIGH SPEED **Electric Traveling Cranes**

Built Promptly for Long and Hard Service.

We design, manufacture and install with requisite appurtenances all kinds of special electric cranes, gantrys, and similar devices for the quick handling of merchandise over any regular or irregular area. Write us.

The North Penn Iron Co., 3rd & Venango Sts., PHILADELPHIA, PA.

JEFFREY Electric LOCOMOTIVES



Coal Mining Machines, Coal Handling, Crushing, Screening, Coal Washing, Elevating, Conveying Machinery.

SEND FOR CATALOGUES.

THE JEFFREY MFG. CO.,

COLUMBUS, OHIO.

New York. Denver.

Type No. 105.

Cleveland Agents: Chas. E. Stamp & Co. New England Bldg.

ELECTRIC AND HAND POWER **CRANES.**

Write us.

NORTHERN ENGINEERING WORKS, No. 6 Chene St., DETROIT, MICH.

CRANES •HIGH•SPEEDS• •ELECTRIC•STEAM•HAND• •MACHINERY FOR HANDLING **COAL** AND **ORE**

THE BROWN HOISTING MACHINERY CO. Works, Cleveland, O.

NEW YORK, 26 Cortlandt Street. LONDON, 39 Victoria Street, S. W.

The Exeter Machine Works,

PITTSTON, PA. NEW YORK OFFICE: 15 CORTLANDT ST.

Manufacturers of

Hoisting Engines For Contractors and Mines.

Elevators and Conveyors For Power Houses, Coal Yards and Mines.

Cleveland Union Station.

Pennsylvania Lines

Foot of Bank Street.

TICKET OFFICES at Union Station, Euclid Av. and Woodland Av. Stations.
New City Ticket Office, No. 1 Euclid Av., Cor. Public Sq.
THROUGH TRAINS RUN AS FOLLOWS BY CENTRAL TIME
*Daily. †Daily except Sunday.

*Daily. † Daily except Sunday.

From Cleveland to	Leave.	Arrive.
Pittsburg & Bellaire	†7:00 a m	†11:20 a m
Salem & Pittsburg	*8:00 a m	*8:30 p m
Salem & Pittsburg	*4:00 p m	*11:30 a m
Philadelphia & New York	*4:00 p m	*11:30 a m
Baltimore & Washington	*4:00 p m	*11:30 a m
Pitts., Bellaire, & East	†1:40 p m	†6:30 p m
Baltimore & Washington	†1:40 p m	†6:30 p m
Ravenna & Alliance	*5:00 p m	*8:10 a m
Philadelphia & New York	*11:30 p m	*5:00 a m
Baltimore & Washington	*11:30 p m	*5:00 a m
Pittburg & Wellsville	*11:30 p m	*5:00 a m

Mt. Vernon & Pan-Handle Route

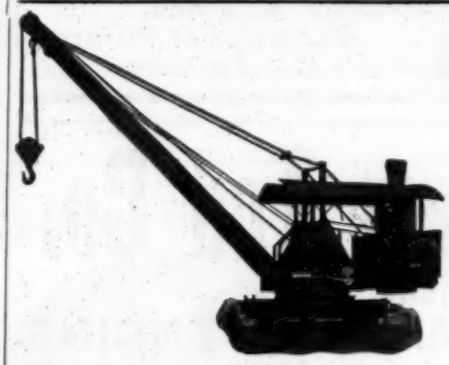
From Cleveland to	Leave.	Arrive.
Akron, Columbus, & Cin.	*8:10 a m	*5:40 p m
Indianapolis & St. Louis	*8:10 a m	*5:50 p m
Millersburg & Columbus	†1:20 p m	†11:05 p m
Col., Cin., Ind., & St. Louis	*7:20 p m	*7:30 a m

Melder's Text Book, Price $2.50

THE CLEVELAND CRANE AND CAR CO

CRANES OF ALL KINDS FOR ALL PURPOSES

SUPERIOR ST. CLEVELAND O.



Locomotive Cranes

IN CAPACITIES

Three to Fifty Tons

INDUSTRIAL WORKS

BAY CITY MICH.

HYDE WATER TUBE SAFETY BOILERS.

Best for Utilizing Waste Heat from Heating Furnaces, Puddling Furnaces, Blast Furnaces.

THE ONLY BOILERS WITH PERFECT CIRCULATION.

HYDE BROS & CO., PITTSBURCH, PA.

The Iron Trade Review

Pays special attention to iron ore, blast furnaces, rolling mill, foundry and machine shop interests. It pays to advertise in it.

STEEL CONSTRUCTION
in All Branches

BUILDINGS DESIGNED AND ERECTED
in all parts of the world

ROOF FRAMES AND TRUSSES
CUPOLAS, LADLES, CONVERTERS
BLAST FURNACES AND STEEL WORKS
BOILERS, TANKS, AND HEAVY PLATE WORK

RITER-CONLEY MFG. CO., PITTSBURG, PA.

THE RETORT COKE OVEN CO.
Engineers and Contractors for
RETORT COKE OVENS,
With or Without Recovery of By-products.
JOHN F. WILCOX, Gen. Mgr. and Chief Engineer.
General Offices: New England Bldg., CLEVELAND, O.

111 Elm Street. **THE CHASE MACHINE CO.** Cleveland, Ohio.
Hoisting, Car Hauling, Docking and Automatic Towing Engines.
Builders of the well known WOOTTERS GAS AND GASOLINE ENGINES.

JULIAN KENNEDY,
Engineer.
Cable Address
"ENGINEER PITTSBURG."
PITTSBURG, PA. U. S. A.

S. V. HUBER & CO.,
CONSULTING ENGINEERS.
Blast Furnaces, Bessemer and Open Hearth Steel Works, Continuous Mills, Hoop Mills, Merchant Mills, Automatic Mill Tables, Labor Saving Devices relating to Rolling Mills, Steam and Hydraulic Machinery.
FERGUSON BUILDING, - - - - - - PITTSBURG, PA.

The Wellman-Seaver Engineering Co.,
CONSULTING AND CONTRACTING ENGINEERS.
NEW ENGLAND BLDG., CLEVELAND, O., U. S. A.
CABLE ADDRESS "WELLSEA" CLEVELAND.
Steel Works, Rolling Mills, Metallurgical Furnaces, Manufacturing Buildings, Machinery for the most economical handling of all kinds of material.
Sole manufacturers of PORTER WATER SEALED REVERSING VALVES and FRASER-TALBOT MECHANICAL GAS PRODUCERS.
LONDON OFFICE: 47 VICTORIA STREET, WESTMINSTER.

IRON CITY ENGINEERING COMPANY, Successors to FESSENDEN & RIDINGER.
Electrical Engineers and Manufacturers' Agents.
Electric Light and Power Installations. Generators, Motors, Arc Lamps, Engines and Boilers, Electric Supplies. Bell Phone I. D. Court 1593. P. & A. Phone Main 1376. 410 Penn Ave., Pittsburg, Pa.

Conestoga Building, **EDWARD E. ERIKSON,** PITTSBURG, PA.
Regenerative Gas Furnaces and Water Seal Gas Producers.
Produces Gas under Tubular Boilers, saving 20 per cent in fuel. NO SMOKE.

THE ENTERPRISE BOILER COMPANY
YOUNGSTOWN, O.
Draught Stacks, Blast Furnaces and Heavy Plate Work a Specialty.
Write for Estimates.

Blast Furnace Construction.
Bessemer and Open Hearth Steel Works.
Engineering
Walter Kennedy,
ENGINEER,
Office, 611 Penn Ave., PITTSBURG, PA.
Long Distance Telephone 3174.

Alex Laughlin & Co.,
Engineers and Contractors.
702-706 Lewis Block,
PITTSBURG, PA.

DAVID LAMOND,
Contracting Engineer,
Ferguson Block, - PITTSBURG, PA.
Blast Furnace Construction.
Agent for C. H. Foote Patent 3 and 4 Pass Fire Brick Stove.

THE GIRARD BOILER & MFG. CO.,
Successors to UNITED BOILER CO.,
GIRARD, - - - - - OHIO.
Tanks, Boilers, Rolling Mill and Blast Furnace Work a Specialty.
'PHONE No. 187. Send for Estimates.

Steel Works AND Rolling Mill Engineers

Garrett-Cromwell Engineering Co.,
New England Building,
CLEVELAND, OHIO.

Newark Iron & Steel Co., NEWARK, OHIO.

Open Hearth Steel Castings, Forge Steel, High Pressure and Hydraulic Fittings, Oil Well Specialties, Castings Made True to Pattern and Uniform.

LONG DISTANCE 'PHONE 358. Orders Solicited. Promptness and Reasonable Prices Our Motto.

HIGH GRADE GRAY IRON AND SEMI-STEEL CASTINGS

For Hydraulic Presses and other high pressure work.

SALAMANDER IRON

For resisting heat, guaranteed to stand fire test three times greater than ordinary gray iron.

Electrical Castings of Guaranteed Magnetic Power

BROKEN MACHINERY WELDED.

Davis & Ludwig Foundry Co.

240-256 Root Street, - CHICAGO, ILL.

GREY and HARD IRON CASTINGS

OF ALL DESCRIPTIONS MADE BY

THE FOOS MFG. CO.,

SPRINGFIELD, OHIO.

Commodious Well-Equipped Modern Foundry.

ORDERS PROMPTLY EXECUTED.

A large and growing circulation among machine shop and foundry firms, has

THE IRON TRADE REVIEW

BRASS FOUNDERS FINISHERS **J. J. RYAN & CO.**

68-74 West Monroe St., Chicago.

Best Bronze, Babbitt Metals, Brass and Aluminum CASTINGS on short notice

LIGHT GREY IRON CASTINGS.

SOFT, STRONG AND TRUE TO PATTERN.

Facilities Unequaled by any in the West. Quality Guaranteed.

WESTERN MALLEABLE & GREY IRON MFG. CO.,

139 Burrell Street, - - MILWAUKEE, WIS.

MALLEABLE

Buhl Malleable Co., DETROIT, MICH.

CASTINGS.

Our students succeed because they use I. C. S. textbooks.

Steam Engineering

A course in Steam Engineering enabling students to pass examinations and secure better positions. Includes operation of dynamos and motors.

We teach by mail, Mechanical, Steam, Electrical, Civil and Mining Engineering; Shop and Foundry Practice; Mechanical Drawing; Architecture; Plumbing; Sheet Metal Work; Chemistry; Ornamental Design; Lettering; Bookkeeping; Stenography; Teaching; English Branches; Locomotive Running; Electrotherapeutics.

When writing state subject in which interested.

taught by mail.

International Correspondence Schools, Box 1018, Scranton, Pa.

Strictly Chemically Pure Acids and Aqua Ammonia,

ESPECIALLY ADAPTED TO LABORATORY WORK.

MANUFACTURED BY

THE GRASSELLI CHEMICAL COMPANY,

General Office and Principal Works, CLEVELAND, O., U. S. A.

STOCKS AT

Tremley, N. J., New York Office, 63-65 Wall Street.
St. Louis, Mo. Cincinnati, O. Milwaukee, Wis. St. Paul, Minn.
Beaver Falls, Pa. East Chicago, Ind. Birmingham, Ala.
Philadelphia, Pa.: Wm. M. Wilson's Sons, 225 Dock Street.
Baltimore, Md.: James Thurston, 210 Buchanan's Wharf.
Chicago, Ill.; James H. Rhodes & Co., 42-44 Michigan Ave.

TINDEL-MORRIS COMPANY,

Eddystone, Pa.

Chicago Office, A. M. Castle & Co., 54 S. Canal St. Boston Office, Harrington, Robinson & Co., 272 Franklin St.

STEEL FORGINGS

Railroad, Marine and Machine. All Shapes. Heavy Shafting. In the rough, rough turned or finished.

OTIS STEEL

"OTIS" FIRE BOX PLATES A SPECIALTY.
Flange Plates, Ship Plates, Tank Plates, Steel Car Axles and Forgings of all Kinds.

Steel Castings from 100 to 75,000 lbs

Head Office and Works, CLEVELAND, OHIO.

Agencies: NEW YORK, 97 Cedar St.
ST. LOUIS, 615 N. Fourth St. WASHINGTON, Kellogg Bldg.
MONTREAL, Homer Taylor, 183 St. James St.
SAN FRANCISCO, John Woodlock, 154-156 First St.

Tropenas Department

Steel Castings,
25 LBS. AND UNDER.
Estimates given on not less than 100 from each pattern.

THE SARGENT CO.,
687 Old Colony Bldg., CHICAGO.

MONONGAHELA IRON & STEEL CO.,
Manufacturers of
Charcoal Bar Iron **CARTER BRANDS** Charcoal Iron Chain
ALL SIZES.
United States Government Specifications Guaranteed. PITTSBURGH, PA.

The Champion Rivet Co.,
CLEVELAND, O., U. S. A.

Victor Boiler and Structural Rivets

FINISH UNEXCELLED. QUALITY HIGHEST STANDARD.
GOVERNMENT WORK A SPECIALTY.

FORGINGS
Pig Iron—Coal—Coke
PILLING & CRANE
PHILADELPHIA OFFICE Girard Bldg Lewis Block PITTSBURG

COVERT MFG. CO.,
West Troy, N. Y.

"Yankee" Snaps
Made in Styles and Sizes.
For Sale by Jobbers at Manfrs. Prices.
COVERT MFG. CO., West Troy, N.Y., U.S.A.

The Vulcanus Forging Co.,
CLEVELAND, O.

RAILROAD AND SPECIAL FORGINGS

Telephone Forgings, Air Brake Pins,
Bolts and Rivets, Lag Screws,
Special Nuts.

Have your rods upset and save 25 per cent of material.

The Elastic Nut Track-Bolt

makes the best and cheapest rail-fastening. NUTS NEVER WORK LOOSE. Requires no nut-lock. Our Elastic Self-Locking Steel Nut always stays, and is superior for use on Cars, Track, Bridges, Machinery etc. Write us for prices on Sq. and Hex. Nuts, (Elastic or Common) Machine Bolts, Track Bolts, Rivets, etc.
NATIONAL ELASTIC NUT CO.,
MILWAUKEE, WIS.

Now is the time for you to spread out.

Extend your business and create a demand for your devices in new fields.

Aluminum Brass and **GRAY-IRON CASTINGS**

For all purposes. Send us your patterns. We will save you money.
No orders too large for our capacity. None too small for our best attention.

RELIABLE FOUNDRY CO.,
P. O. Box 42, Quincy, Ill.

H. C. FRICK COKE CO.,

Post Office,
PITTSBURG, PA.

Producers of

Connellsville Coke Only.

"FRICK COKE"

For Blast Furnaces and Foundries; also Crushed Connellsville Coke (substitute for Anthracite Coal) for manufacturing and domestic purposes.

13,500 Ovens.

Daily Capacity 30,000 tons of Coke.

Mines and Ovens in the Connellsville Coke Region, Pennsylvania.

Direct connection with all the railroads entering the region.

Quotations, Freight Rates, Pamphlets giving full information promptly furnished on application.

OF INTEREST TO Manufacturers

Write for copy of pamphlet just issued by the

ILLINOIS CENTRAL R.R. COMPANY

giving reliable information concerning nearly 200 desirable locations for industries, and entitled

INDUSTRIAL SITES IN TEN STATES

Address GEO. C. POWER,
Industrial Commissioner, Illinois Central Railroad
Room 506, Central Station, CHICAGO, ILL.

FOUNDRY COKE

Agents:
General Hocking Fuel Co.,
Connellsville.
Stonega
and
Pocahontas
72 Hour Coke.

O'GARA, KING & CO.

810-820 Old Colony Bldg.,
CHICAGO.
Exclusive Agents for Roaring Creek & Belington Railroad Co. of West Virginia. Randolph Smokeless Coa

Exclusive Sales Agents:
Diamond K. Brazil,
Indiana Block.
Youghiogheny,
Piedmont,
Cumberland,
Blossburg.

SMITHING COAL

BESSEMER COKE COMPANY,
Manufacturers of
CONNELLSVILLE COKE,
Furnace, Foundry and Crushed Coke.
MINES AND OVENS IN CONNELLSVILLE REGION.
Direct connections with all railroads entering the region.
Offices: - - Lewis Block, PITTSBURGH, PA.
CAPACITY, 75 CARS DAILY. INDIVIDUAL CARS.

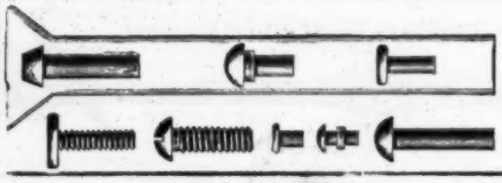
POCAHONTAS COKE AND COAL CO.
W. H. COFFMAN COKE CO.
Bluefield, W. Va.
General Factors and Shippers of
POCAHONTAS FLAT-TOP COAL AND COKE.
Spot Shipments of Furnace Coke a Specialty.

THE BASSETT-PRESLEY COMPANY,
IRON & STEEL.
CLEVELAND, OHIO.
Try our celebrated CROWN IRON—3-8 in. to 2 in. carried in stock.

Basic Open Hearth Steel Billets, Blooms and Slabs,
Guaranteed Analysis for Rolling Mill and Forging Purposes.

A. M. Crane & Company,
The Rookery, CHICAGO

Manufacturers of the Simplex Car and Track Jacks, and dealers in Pig Iron, Steel and Iron Bars, Springs and Wire.



BUILDERS OF
Automatic Rivet Machines.
See next issue of this paper for our list of catalogues.
Waterbury Farrel Foundry & Machine Co.,
Waterbury, Conn.

An advertisement in this paper will pay, because our readers are buyers.

We Manufacture and Erect

STEEL FRAME MILL BUILDINGS

in all parts of the United States.

IRON and STEEL TANKS for Liquids or Gases.

GERM PROOF WATER FILTERS, 10 gal. to 10,000 gal. capacity per hour.

RIVETED STEEL PIPE.
STEEL STACKS.

Wm. B. Scaife & Sons,
(Established 1802.)
PITTSBURGH, - - - PA.

PERFORATED PLATE SCREENS
AS REQUIRED FOR
STONE, ORE, ZINC, LEAD, and all Railroad and Mining Uses.
Special Screens for COAL and COKE.
THE HENDRICK MFG. CO., LTD.,
Samples and information upon request.
Carbondale, Pa.

A PROTECTIVE AGAINST RUST,
A SAFEGUARD AGAINST FIRE.

That's

Wisconsin Graphite Paint.

It protects metallic surfaces against rust; safeguards wooden ones against fire.

It fills the pores of either, obviating the corroding influences of moisture and the chemical properties of smoke-laden atmospheres.

Because it has properties simulating asbestos, it resists the action of fire—is a slow burner.

Comes in six shades of color.

A sample can if you send your address.

Wisconsin Graphite Company,
413 Market St., PITTSBURG, PA.

Who builds the best Mine Pump?

PRESCOTT.

Fred. M. Prescott Steam Pump Co.,

MILWAUKEE, WIS.

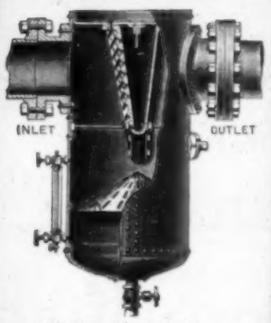


Fig. D. HORIZONTAL.

Steam Separators

WE'LL BOTH BE SATISFIED

When your steam plant is equipped with

AUSTIN SEPARATORS,

the kind that eliminate all oil, grease and other impurities from exhaust—all condensation from live steam—the safest, surest, best separator on the market.

We ship to responsible parties on 30 days' trial, to be returned at our expense if not satisfactory.

AUSTIN SEPARATOR COMPANY
159 Woodbridge St
DETROIT, MICH.

Oil Separators

L.L. CLINE Adv. Co.

An effective ad. sells goods.

An ad. must reach buyers or no sale.

THE IRON TRADE REVIEW goes to men who own machinery and must buy more.

The moral is: Write for rates. Here hesitation is loss.

PHOENIX HORSE SHOES—ARE THE BEST HORSE SHOES MADE

CATALOGUE SENT ON REQUEST.

PHOENIX HORSE SHOE CO., POUGHKEEPSIE, N. Y.—JOLIET, ILL.

Five Years Ago

Carborundum wheels for general machine shop use were first put on the market—
Today they are used in almost every large machine shop in the country—
There's a reason for it—
a new product doesn't make progress like that by chance.

Write for the Carborundum booklet telling all about it.

The Carborundum Company,
Niagara Falls, N. Y.

THE

DAILY METAL MARKET REPORT

Published by

THE REPORT CO.,

Room 79, 99 John St., New York.

Gives daily reports of foreign and domestic metal markets. Shows daily fluctuations in all metals, both in this country and in Europe. Contains the latest news affecting the market for Pig Iron, Steel, etc. Write for sample copy. We guarantee a circulation greater than the combined circulation of all competitors. As an advertising medium for reaching the Iron, Steel and Metal producers and consumers it has no superior.

A. Garrison Foundry Co.,

PITTSBURG, PA.

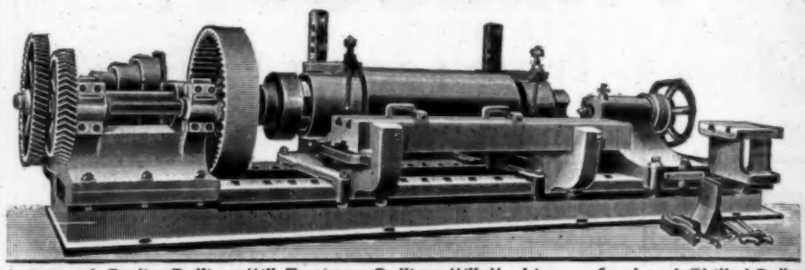
MANUFACTURERS OF

SAND and CHILLED ROLLS, and ROLLING MILL CASTINGS

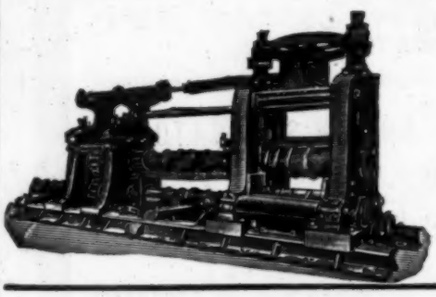
of every description.

The George A. Hogg Iron & Steel Foundry Co.,

PITTSBURG, PA.



Aetna and Corliss Rolling Mill Engines, Rolling Mill Machinery, Sand and Chilled Rolls, Freeman Furnace Charger, etc.



Frank-Kneeland Machine Co.,

54th St., PITTSBURG, PA.

CHILLED, SAND AND STEEL **Rolls.**

ROLLING MILL MACHINERY.

Canton Roll & Machine Company, Canton, Ohio.

MANUFACTURERS OF

Chilled, Sand and Semi-Steel Rolls.

Rolling Mill and Tin Plate Machinery.

HEAVY CASTINGS OF EVERY DESCRIPTION.

ESTIMATES FURNISHED FOR COMPLETE PLANTS.

STEAM HAMMERS

DOUBLE STAND.

Made Especially for Hammering TOOL STEEL.

Sizes from 400 to 3,000 pounds.
Fitted with our Improved Piston Valve.

Samuel Trethewey & Co., Ltd.,
PITTSBURG, PA.

BEST MANUFACTURING CO., Pittsburg, Pa.

GULLAND { Best Gate / REGULATING / REDUCING / Heston Blowoff **VALVES**

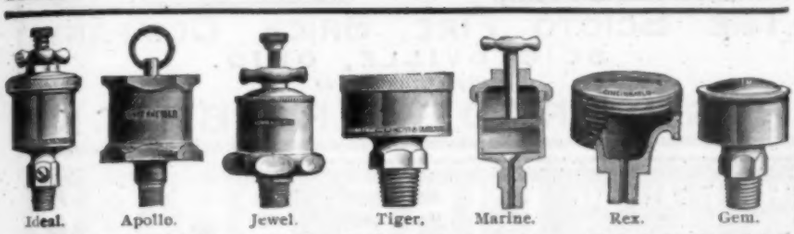
High Pressure PIPING for POWER PLANTS ERECTED COMPLETE In all parts of the world.

GUN IRON, SEMI-STEEL, AIR FURNACE **CASTINGS** STEEL, BRASS AND CLIMAX BRONZE.

Write for Book R.

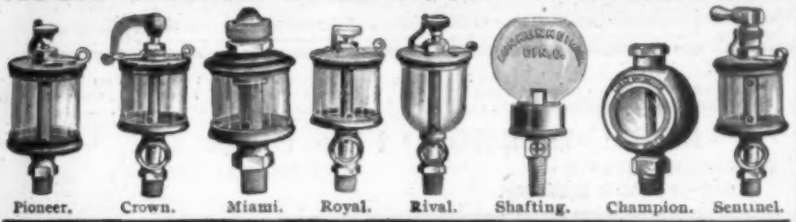
WEST PENN FOUNDRY & MACHINE CO.,
AVONMORE, PA.

Manufacturers of
TIN, SHEET AND BAR MILL PLANTS.
Blast furnace work. Steel work. Hydraulic machinery. General castings of every description.



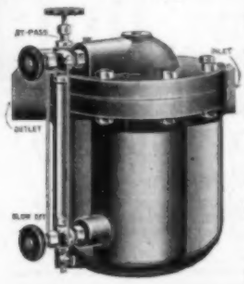
Use Grease or Oil and Lunkenheimer Cups and you will have bearings lubricated to your entire satisfaction. Endorsed by millions of satisfied users. Specify them and order from your dealer. Write for catalog of Brass and Iron Engineering Appliances of superior quality.

THE LUNKENHEIMER CO. Office and Works: CINCINNATI, O., U. S. A. London—35 Great Dover St., S. E. New York—26 Cortlandt St.



The Wright Improved Safety Water Column

Gives fullest measure of satisfaction always. The name is a guarantee of first-class material and workmanship, absolute safety and certainty.



THE WRIGHT EMERGENCY STEAM TRAP

A wasteless trap of wonderful capacity.

Particulars of the above sent on request.

WRIGHT MANUFACTURING CO.
30 Shelby-cor. Woodbridge. DETROIT, MICH.

E. R. ALLEN,
MANUFACTURER OF
All kinds of soft, fine, medium and heavy Gray Iron Castings to order. Boiler, Heater and Architectural Iron Castings a specialty.
Send for Prices and Estimates.
CORNING, NEW YORK.

Le Chatelier's
PYROMETER
For measuring temperatures between 0 and 2,900° F.
Recommended by the Highest Authorities.
Successfully used in establishments for the manufacture of

Gas,	Chamotte,
Chemicals,	Cement,
Sugar,	Accumulators,
Terra Cotta,	Incandescent Lamps,
Stone Ware,	Cartridges and Ammunition.
Porcelain,	Glass.

Iron and Steel, Malleable Iron.
Also by Boiler Inspectors, Schools and Colleges, for hardening and annealing steel in roll foundries, etc.
VULCAN MFG. CO., Ltd.,
Pittsburg, Pa.
Station A.

Locations for Industries.

The name of the Chicago, Milwaukee & St. Paul Railway has long been identified with practical measures for the general upbuilding of its territory and the promotion of its commerce, hence manufacturers have an assurance that they will find themselves at home on the company's lines.

The Chicago, Milwaukee & St. Paul Railway Company's 6,300 miles of railway, exclusive of second track, connecting track or sidings, traverses eight states, namely:

NORTH DAKOTA	MINNESOTA	NORTHERN MICHIGAN
SOUTH DAKOTA	IOWA	WISCONSIN
Express Passenger Trains Fast Freight Trains Throughout.	MISSOURI	ILLINOIS

which comprise a great Agricultural, Manufacturing and Mining territory.

The Chicago, Milwaukee & St. Paul Railway Company gives unremitting attention to the development of local traffic on its lines and, with this in view, seeks to increase the number of manufacturing plants on its system either through their creation by local enterprise or the influx of manufacturers from the East. It has all its territory districted in relation to resources, adaptability and advantages for manufacturing. Specific information furnished manufacturers in regard to suitable locations. Address,

LUIS JACKSON,
Industrial Commissioner, C. M. & St. P. R'y
Old Colony Building, Chicago, Ill.

MOUNT SAVAGE FIRE BRICK.

UNION MINING CO.

ESTABLISHED 1841.
CAPACITY,
60,000 PER DAY; 18,000,000 PER YEAR.
The First Manufactory of Its Kind in the United States.

Proprietors of the
Celebrated
Mount Savage Fire Brick.
GOVERNMENT STANDARD.

Home Office and Works: MOUNT SAVAGE, Allegany County, Maryland.
Branch Offices: No. 1 Broadway, NEW YORK, N. Y.; Land Title Bldg., Broad & Chestnut Sts., PHILADELPHIA, PA.; Park Building, PITTSBURGH, PA.; Stowe, Fuller & Co., 249 Arcade, CLEVELAND, O.; N. A. Williams Co., 219 E. Washington St., CHICAGO, ILL.

SPECIAL BRICK

For Open Hearth and Bessemer Steel Casting.

SHAPES

of all kinds made to order.
Our facilities for prompt shipment are unexcelled.
Send blue prints or sketches and we will quote satisfactory prices.

The MANOWN MFG. CO.

GENERAL OFFICES:
Hussey Bldg., PITTSBURG, PA.

THE SCIOTO FIRE BRICK COMPANY,

SCIOTOVILLE, OHIO.
MANUFACTURERS OF
HIGH GRADE FIRE BRICK.

High Grade FIRE BRICK

The Crown Fire Clay Company,
AKRON, OHIO.
76 Kilns, 75,000 Daily Output. 911 Chamber of Commerce, CHICAGO.

The Oak Hill . . . Fire Brick & Coal Co.

OAK HILL, OHIO,
Manufacturers of the celebrated
O. K. CROWN, O. K. and A brands of Fire Brick.
Close attention given to special shapes and sizes. Prompt service and good workmanship guaranteed. We solicit correspondence. Catalog and samples on application.
Chicago Office: 470 The Rookery, Chicago.

Best material obtainable. Highest standard attainable. A third of a century of successful experience. . . .

Seven works in two states on three competing trunk lines. One quarter of a million daily capacity. . . . .

REESE-HAMMOND FIRE BRICK CO.,

PITTSBURG OFFICE:
912-914 Park Building.

GENERAL OFFICE:
Bolivar, Pa.

High Grade Fire Brick

FOR ALL PURPOSES.

Special Attention given to the Furnace and Foundry and Coke Trade.

A. F. SMITH & CO.,

MANUFACTURERS OF
Fire Brick and Clay,
BEAVER COUNTY SAND STONE.
Telephone 42. NEW BRIGHTON, PA.

FIRE BRICK

DOVER FIRE BRICK CO.,
MANUFACTURERS OF
Furnace, Mill & Special Shape Fire Brick
Office, 508-509 Cuyahoga Bldg.,
CLEVELAND, O.

Established 1856.

A. J. HAWS & SONS, Ltd.,

Office and Works, JOHNSTOWN, PA.
Manufacturers of the
HAWS SILICA BRICK.
Capacity 27,000,000 per annum.

Tuyeres and Brick Converter Bottoms for Bessemer Steel Works; also Ladle Nozzles, Stopper Rod Sleeves, Runner Brick for Bottom Casts. Blast Furnace Linings, Ground Fire Clay, and all kinds of Fire Brick.

MOULDING SAND.

JOHN H. EHLEN, Newport, Ky.

Have several banks of the very best grades of the famous Newport Sand. All grades medium and fine brass work a specialty. Good shipping facilities. Samples and Prices on application. I do not ship Indiana sand for Newport. A trial and the billing will prove it not necessary to practice deception like some of my competitors.

DIXON'S Pure Flake Graphite,

THE PERFECT LUBRICANT.
Sample and Pamphlet Free.
JOSEPH DIXON CRUCIBLE COMPANY, JERSEY CITY, N. J.